

Humanitarian and Environmental Action to Address Nuclear Harm

The Treaty for the Prohibition of Nuclear Weapons as a
Normative Framework for Assisting Victims of Nuclear Weapons
Use and Testing and Remediating Contaminated Environments

Background Paper

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Executive Summary and Recommendations

The development, production, testing and use of nuclear weapons has had catastrophic humanitarian and ecological consequences on people and environments around the world. ‘Nuclear harm’ – the damage caused by blast, incendiary and radioactive effects of nuclear weapons use, testing and production, as well as by other nuclear technologies – poses threats to the pursuit of the 2030 Sustainable Development Agenda.

Due to advocacy by the International Campaign to Abolish Nuclear Weapons (ICAN), recognized by the 2017 Nobel Peace Prize, the new Treaty on the Prohibition of Nuclear Weapons (TPNW) established ‘positive obligations’ on affected states to assist victims of nuclear weapons use and testing and to remediate contaminated environments. To ensure that the burden does not fall unduly on affected states, the TPNW requires all states to engage in international cooperation and assistance to achieve these and the treaty’s other goals. While the TPNW does not explicitly cover all forms of nuclear harm, and the universalization of the treaty may take some time, its implementation offers the opportunity to build a normative framework and institutional architecture for humanitarian and environmental action to address nuclear harm.

In implementing the TPNW’s positive obligations, states should draw on lessons learned from implementing the victim assistance, clearance and risk reduction provisions in other humanitarian disarmament treaties, including the Antipersonnel Mine Ban Treaty (MBT), Convention on Certain Conventional Weapons (CCW) Protocol V on Explosive Remnants of War (ERW Protocol) and the Convention on Cluster Munitions (CCM). In particular, as they implement victim assistance and environmental remediation efforts to address nuclear harm, states, international and regional organizations and civil society should work together in:

- 1. Supporting needs assessments at the local, national and global levels, to assess the scope of ongoing humanitarian and environmental harm caused by nuclear weapons, before the First Meeting of States Parties of the TPNW,**
- 2. Ensuring participation of survivors and affected communities in all stages of assessment, planning, implementation, monitoring and evaluation,**
- 3. Establishing rigorous national implementation measures, including administrative structures, policies, focal points and standards,**
- 4. Formulating and adopting an Action Plan at the First Meeting of States Parties,**
- 5. Convening international discussions on governing principles and quality standards rooted in international humanitarian, human rights and environmental norms,**
- 6. Encouraging public and private donors to engage in international cooperation and assistance to address nuclear harm (perhaps through a voluntary trust fund) and inviting States Not Party to contribute Official Development Assistance,**
- 7. Building a community of practice by establishing linkages between organizations already implementing relevant programs, through meetings, workshops and sharing of lessons learned,**
- 8. Establishing systems to monitor and evaluate progress.**

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Contents

A. Global Overview of Nuclear Harm	4
i. Nuclear Weapons Use in Hiroshima and Nagasaki	4
ii. Nuclear Weapons Testing.....	4
iii. Production, Management and Transportation of Nuclear Weapons	8
iv. Other Forms of Nuclear Harm.....	9
v. Further Reading on Nuclear Harm	9
B. Threats Posed by Nuclear Harm to the Sustainable Development Agenda	10
C. Existing Capacities for Addressing Nuclear Harm	11
i. International Programs.....	11
ii. Bilateral Efforts	11
iii. National Measures.....	12
v. Civil Society Contributions	13
D. The TPNW as a Normative Framework for Humanitarian and Environmental Action	14
E. Learning Lessons from Implementing Other Humanitarian Disarmament Instruments.....	15
i. Supporting Needs Assessment.....	16
ii. Ensuring Participation of Survivors and Affected Communities	17
iii. Establishing Rigorous National Implementation Measures	17
iv. Formulating International Action Plans	19
v. Convening International Discussions on Governing Principles and Quality Standards.....	20
vi. Encouraging Donor Engagement, Inviting Participation of States Not Party	22
vii. Building a Community of Practice	22
viii. Establishing Systems to Monitor and Evaluate Progress.....	23
About the Author	23
Annex: Preliminary List of Potential and Confirmed Countries Affected by Harm from Nuclear Weapons Activities	24

A. Global Overview of Nuclear Harm

The nuclear age has left an ongoing legacy of quiet violence on people and environments in many parts of the world. Nuclear weapons use, testing, development and production has caused multigenerational human harm and persistent environmental damage that pose a threat to sustainable development. Governments, international organizations and civil society efforts to address this harm are crucial, but are currently inadequate to meet the many needs of survivors and contaminated environments.

i. Nuclear Weapons Use in Hiroshima and Nagasaki

The US atomic bombings of Hiroshima and Nagasaki, Japan, killed more than 200,000 people in 1945. Those who survived have suffered many difficulties. As of March 2017, there were more than 164,000 *hibakusha* (atomic bomb survivors) living in Japan,¹ who deal with ‘thyroid, breast, lung and other cancers at higher than normal rates.’² The effects of the bombings have also been passed down through generations to children and grandchildren. Children exposed to radiation *in utero* were more likely to suffer from developmental disabilities ‘and have smaller brains and impaired growth, as well as increased risk of developing cancer.’³ Ionizing radiation has a disproportionate impact on women, who have also struggled against pervasive social stigma.⁴ A considerable number of foreigners were exposed to the radioactive contamination in Hiroshima and Nagasaki. Notably, 22,000 Korean nationals (many of whom were coerced into labor and sexual slavery) died and 30,000 survived the atomic bombings.⁵ There were Allied prisoners of war in both cities, including American, Australian, British and Dutch soldiers.⁶

According to the US Department of Veteran Affairs, 195,000 US troops participated in the occupation of Hiroshima and Nagasaki; they, along with American PoWs in the two cities, are recognized as ‘Atomic Veterans.’⁷ The British Commonwealth Occupation Force (BCOF), consisting of 45,000 troops from Australia, Britain, India and New Zealand, was stationed in Hiroshima after the Japanese surrender.⁸ There are also a significant number of Japanese American *hibakusha* – both American nationals who were in Hiroshima and Nagasaki at the time and those who emigrated later. In 2014, about 1,000 Japanese American *hibakusha* were still alive.⁹

ii. Nuclear Weapons Testing

Nuclear weapons have not been used in war since 1945. Nevertheless, nuclear weapons and other nuclear explosive devices have been tested in the atmosphere and in numerous communities around the world. The effects, particularly of atmospheric testing, are global. International Physicians for the Prevention of Nuclear War (IPPNW) estimates that ‘roughly 2.4 million people will eventually die as a result of the atmospheric nuclear tests conducted between 1945 and 1980, which were equal in force to 29,000 Hiroshima bombs.’¹⁰

Nuclear-armed and -aspirant states have frequently tested devices in areas that they considered peripheral, which has put a disproportionate burden on indigenous communities.¹¹ The USA detonated 1,040 nuclear devices in 945 tests within or above the continental United States, mostly at the Nevada Test Site (1,021 detonations in 928 tests).¹² The US federal government also recognizes that people in 12 western states (Arizona, Colorado, Idaho, Nevada, New Mexico, North Dakota,

Oregon, Utah, Washington, Wyoming, Texas and South Dakota) have ‘developed serious illnesses after exposure to radiation’ as a result of the tests. Between 1992 and March 2016, the US Department of Justice approved 3,963 Radioactive Exposure Compensation claims for ‘onsite participants’ in nuclear tests and 19,555 claims from ‘downwinders’ (those exposed to fallout from the Nevada Test Site) who had ‘contracted certain cancers and other serious diseases as a result of their exposure.’¹³ There is ‘high risk of groundwater contamination with several radioactive isotopes’ in the Nevada Test Site.¹⁴

The US government also conducted 106 tests in the Pacific and its islands, including 66 in the Bikini and Enewetak Atolls in the Marshall Islands, 24 in Kiritimati (formerly Christmas) Island in what is now the Republic of Kiribati, and 12 at Johnston Island, a US territory known to Native Hawaiians as Kalama Atoll.¹⁵ The consequences of the Pacific tests were devastating:

Pollution of marine ecosystems in the region, and particularly the impact on the local population in terms of the drastic increase of thyroid cancer incidence as a result of the population’s exposure to extremely high doses of radiation, were the negative consequences of the most serious episode of radioactive contamination in the history of nuclear weapons testing.¹⁶

Lemyo Abon, who was living in the Rongelap Atoll, Marshall Islands, during the massive 1954 Castle Bravo test, told the International Campaign to Abolish Nuclear Weapons (ICAN) that ‘For almost 60 years, we have been displaced from our homeland, like a coconut floating in the sea with no place to call home.’¹⁷ Only a quarter of the Rongelap Atoll ‘has been “rehabilitated” and made safe for habitation, while the rest remains contaminated with radionuclides such as caesium-137.’¹⁸ Those removed from the Bikini Atoll ‘were later moved to Rongerik, where they endured periods of near-starvation, then Kwajalein, then Kili, where there was no lagoon or fishing grounds to support their traditional way of life.’¹⁹ A 2012 report of the UN Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes found that ‘nuclear testing resulted in both immediate and continuing effects on the human rights of the Marshallese’, including ‘fatalities...acute and long-term health complications... environmental contamination, leading to the loss of livelihoods and lands [and] indefinite displacement.’²⁰ In 1954, the Japanese fishing boat *Daigo Fukuryū Maru* (Lucky Dragon 5) was exposed to fallout from the Castle Bravo test on Bikini Atoll. One fisherman died and the rest of the crew suffered health complications and stigma. Tuna that they had caught was sold in the marketplace before it was clear that it was contaminated.²¹

An additional three US atmospheric tests were conducted above the South Atlantic.²²

Some 210,000 US troops participated in the nuclear tests (the numbers are contested).²³ Many have suffered medical problems as a result and feel ‘abused, neglected and forgotten by the government and a country that exposed them to unforeseen risks.’²⁴

The Soviet Union also tested its nuclear weapons in regions far from Moscow. It detonated 456 nuclear explosive devices at the Semipalatinsk test site in Kazakhstan, 130 on Novaya Zemlya, a Russian Far North archipelago, and an additional 129 at other locations in Russia, Kazakhstan, Turkmenistan, Ukraine and Uzbekistan.²⁵

Five hundred indigenous people were removed from Novaya Zemlya to make way for the test site.²⁶ As an indicator of the environmental impact, most of the reindeer in the archipelago died or were moved to mainland Russia.²⁷

The Semipalatinsk region 'is heavily contaminated with radioactive isotopes...in the soil...vegetation... [and] local water bodies.'²⁸ Semipalatinsk was also exposed to radioactive pollution from Chinese nuclear tests at Lop Nur in the Tarim Basin, near the Kazakh border.²⁹ The 200,000 residents of the Semipalatinsk oblast were used as 'human guinea pigs' to study the effects of radiation. They were reportedly:

ordered to step outside their homes during test blasts so that they could later be examined as part of studies on the effects of radiation. And they are paying a horrendous price. ... One in every 20 children in the area is born with serious deformities. Many struggle with different types of cancer and more than half of the local population has died before reaching the age of 60.³⁰

Harm from Soviet tests was also not limited to the areas of the former Soviet Republics. A 2013 study demonstrated long-term 'declines in education attainment, high school completion, and earnings' of Norwegians exposed *in utero* to radiation from Soviet nuclear test fallout from Novaya Zemlya.³¹ An earlier study found higher risks of thyroid cancer in subjects exposed to fallout in Norway and Sweden.³² Radioactive contamination also spread to Canada and Alaska.³³

The UK conducted 12 atmospheric tests in Australia at Maralinga, Emu Field, and the Montebello Islands, which are 'responsible for the radioactive pollution of vast areas of the Australian continent.'³⁴ The UK also conducted some 600 'minor trials' – experiments that left Maralinga contaminated with '8,000 kg of uranium, 24 kg of plutonium, and 100 kg of beryllium.'³⁵ Australian government statistics from 2010 recognized 16,716 'Australian participants in the British Atomic Tests Program conducted in Australia'; 8,126 were military personnel, 8,590 were civilians.³⁶ The radioactive contamination at Maralinga has had a disproportionate impact on indigenous people, many of whom 'continued to move throughout the region at the time of the tests. It was later discovered that a traditional Aboriginal route crossed through the Maralinga testing range.' The 'effects were not only radiological: restrictions on the indigenous population's access to their traditional lands also caused psycho-social and cultural problems.'³⁷ Similarly, according to the 1984 McClelland Royal Commission, 'The presence of Aborigines on the mainland near Monte Bello Islands and their extra vulnerability to the effect of fallout was not recognized....'³⁸ In 2001, New Zealand's government identified 11 New Zealand soldiers who participated in UK tests in Australia.³⁹

The UK also conducted nine tests at Malden Island and Kiritimati Island in Kiribati.⁴⁰ Almost 14,000 British, Fijian and New Zealand soldiers, around 100 Gilbertese people and two British women from the Women's Voluntary Service participated in the tests.⁴¹ According to a study published in the *International Review of the Red Cross*, 'radiation exposures for service personnel ... were not systematically monitored, and personal protection was minimal. ... "Clean-up" operations included disposing of thousands of seabirds maimed, blinded or killed by the nuclear explosions, as well as dumping drums of nuclear waste into the ocean.'⁴² In 2015, Kiribati's Permanent Representative to the UN, Ambassador Makurita Baaro stated, 'Today, our communities still suffer

from the long-term impacts of the tests, experiencing higher rates of cancer, particularly thyroid cancer, due to exposure to radiation.⁴³

In 2014, there were 3,000 surviving British test veterans, of 21,000 British personnel who participated in the UK testing program.⁴⁴ In 2015, there were 24 surviving Fijian nuclear test veterans of the 100-500 who served in the UK tests.⁴⁵ A 1999 medical study of 2,500 men who participated in the UK tests (2,200 UK, 238 New Zealand and 62 Fijian) found that two-thirds of those who had died had cancers. Data on the 5,000 children and grandchildren of 1,000 such veterans found elevated rates of health problems consistent with multigenerational effects of radiation exposure, including a rate of spina bifida at 5 times the UK average.⁴⁶

For a comprehensive review of the humanitarian impact of British nuclear testing, see Nic Maclellan's book, *Grappling with the Bomb*.⁴⁷

France conducted its first nuclear tests in Algeria – four at Reggane and 13 at Ekker.⁴⁸ This resulted in 'significant environmental contamination in North Africa, particularly high in desert sand.'⁴⁹ The French Ministry of Defense has claimed that local people were not adversely impacted by the tests, but Algerian government data suggests that 'radiation in some areas near the test sites is 20 times higher than the norm.'⁵⁰ People continue to be exposed to radiation through 'inhalation and ingestion of contaminated particles (dust).'⁵¹

France also caused 'intense radioactive pollution of marine ecosystems' in its 179 tests in the Moruroa Atoll and 14 in the Fangataufa Atoll, French Polynesia. This has caused 'increased incidence of thyroid cancer in the local population' mainly as a result of contaminated of the food and water supply.⁵² Indigenous workers employed in the clean-up of Moruroa atoll received less protection than those in the French government's Radiological Safety Service. Medical studies have shown that risks of inheriting thyroid cancer as a result of familial exposure to nuclear testing in French Polynesia is 'particularly high in Maohi populations.'⁵³ Teraivetea Raymond Taha, a former Moruroa worker who later suffered from leukemia and whose one-year-old daughter died from a malformed lung, recalls:

They were all dressed in special outfits with gloves and a mask. We Maohi workers were just following on behind them, without any special gear to protect us.... The bosses said: 'It's OK, you can go over there.' We were scared, but if we'd refused, we would have been on the next plane back to Tahiti. We would have lost our job, so we went ahead cleaning up without asking any questions.⁵⁴

The New Zealand posted two frigates near Moruroa in 1973 to protest French testing; the 551 crew may have been exposed to radiation.⁵⁵

The tests caused 'extensive physical damage' to the atolls themselves 'with ongoing risks of collapse and leakage'; 'radioactive, chemical and other waste on land, in lagoons and in the ocean remains both at the former testing sites and at a network of facilities and infrastructure supporting the massive nuclear weapons enterprise.'⁵⁶

At Lop Nur in Xianjiang province, China exploded 45 nuclear devices (23 atmospheric and 22 underground tests).⁵⁷ Cancer incidence in Xianjiang province, populated primarily by the minority

Uygur community, is '30–35 % higher than the average rate across China.'⁵⁸ One statistical model suggested that as a result of the tests, '194,000 people would have died as a result of acute radiation exposure. Around 1.2 million received doses high enough to induce leukemia, solid cancers and fetal damage.' However, the Chinese government 'steadfastly refuses to acknowledge' the scale of ongoing harm.⁵⁹

Given the relatively lower number of tests, which have occurred underground, little is currently known about the impact of nuclear testing in India (six underground tests), Pakistan (six underground tests) and North Korea (six underground tests).⁶⁰ However, at the time of writing, North Korea was threatening the first atmospheric test since 1980. Experts warned that there was a high risk of catastrophic humanitarian and environmental consequences.⁶¹

iii. Production, Management and Transportation of Nuclear Weapons

The harms caused by nuclear weapons are not limited to nuclear explosions caused by their use or testing. There are a shocking number of accidents associated with the stockpiling, maintenance and transportation of nuclear weapons, compellingly documented in the Eric Schlosser book *Command and Control*.⁶² A 1981 declassified US government document lists 32 officially-recognized 'broken arrows' – accidents involving US nuclear weapons – between 1950 and 1980.⁶³ For example, in 'one of the worst nuclear disasters of the Cold War' an American B-52 bomber had an in-air collision with a refueling plane in 1966, dropping four nuclear weapons on the village of Palomares, Spain. The bombs did not detonate, but contaminated the area with plutonium, which has had a negative impact on the area's agricultural market.⁶⁴ Similarly, in 1968, a B-52 crashed at Thule Air Force Base in Greenland. The high explosives in its four bombs detonated but did not initiate a nuclear reaction. Nevertheless, during the clean-up 'more than 500,000 gallons of contaminated water' had to be removed 'at a cost of almost \$10 million'. One of the bombs, probably hidden under ice, has never been recovered.⁶⁵

The production of nuclear weapons also relies on dangerous raw materials and produces considerable hazardous waste. Uranium is mined in 20 countries around the world, with 85% coming from Kazakhstan, Canada, Australia, Niger and Russia.⁶⁶ This poses 'significant risks to the ... environmental and public health' of communities in proximity to such activities, according to research by the Natural Resources Defense Council.⁶⁷ The supply chain of uranium ore used for nuclear weapons and peaceful uses of nuclear power is not always clearly separate. The US Department of Justice has paid compensation to 8,215 uranium mining, milling and transportation workers who developed radiation-related illness.⁶⁸ Greenpeace and other civil society organizations have raised concerns about the health and ecological impact of uranium mining in Niger.⁶⁹

The transportation, reprocessing and storage of radioactive waste from both nuclear weapons and peaceful uses of nuclear energy has raised many concerns.⁷⁰ In the 1957 Kyshtyn incident, the failure of a cooling system at a nuclear weapons waste facility resulted in an explosion sending '20 million curies of radioactive material into the sky, where it was scattered by the wind. It settled over an area of 20,000 square kilometers, home to 270,000 people.'⁷¹ US production of plutonium for weapons from uranium fuel rods, 'left behind more than 100 million gallons of hazardous liquid waste [that]...contains both hazardous chemicals and radioactive materials.'⁷² Moreover, 'Clothing, glassware, tools, equipment, soils and sludges' used in the nuclear weapons production process

‘became contaminated with radioactive materials.’⁷³ Storage of such waste poses serious challenges for the US Department of Energy.⁷⁴

Moreover, as part of their nuclear weapons programs, the US and Soviet Union conducted harmful radiation experiments on people, often secret and without proper informed consent.⁷⁵

iv. Other Forms of Nuclear Harm

In addition to the harms caused by nuclear weapons, there are other relevant sources of nuclear and radiological harm. Accidents at nuclear power plants can have devastating humanitarian and environmental consequences, as illustrated by the disasters at Fukushima (Japan, 2011), Chernobyl (Ukraine, 1986), Three Mile Island (USA, 1978) and Enrico Fermi Unit 1 (USA, 1966).⁷⁶ Nuclear power reactors have sometimes been used to produce fuel for nuclear weapons; the Chernobyl plant produced plutonium for the Soviet weapons program.⁷⁷ Seven million people were exposed to fallout in Belarus; 400,000 people were displaced and 70,000 of the emergency response workers now have disabilities. Two million people continue to live in areas of high contamination.⁷⁸ Radioactive contamination from Chernobyl has been discovered in reindeer meat in Finland, Norway, Russia and Sweden, potentially impacting indigenous Sami people.⁷⁹

While not specifically related to nuclear weapons use and testing, the health and environment impact of the use of depleted uranium in ammunition remains of significant concern. However, UN Environment (formerly the UN Environment Programme or UNEP) states that there are ‘major scientific uncertainties ... regarding the long-term environmental impacts of depleted uranium, particularly with respect to long-term groundwater contamination.’ It has recommended ‘a precautionary approach to the use of depleted uranium... action be taken to clean up and decontaminate the polluted sites... [and] awareness-raising among local populations and future monitoring.’⁸⁰ In 2016 the UN General Assembly passed a resolution (A/RES/71/70) calling for further study of the issue, provision of assistance to affected states and greater transparency over the use of the weapons. The International Coalition to Ban Uranium Weapons is calling for a global prohibition.⁸¹

v. Further Reading on Nuclear Harm

For further information on the scope of global nuclear harm, read these comprehensive resources:

- ❖ Nils-Olov Bergkvist & Ragnhild Ferm. (July 2000) *Nuclear Explosions: 1945-1998*. Stockholm, SIPRI. p. 8. Available from: https://www.iaea.org/inis/collection/NCLCollectionStore/_Public/31/060/31060372.pdf.
- ❖ Remus Pravalie. (2014) ‘Nuclear Weapons Tests and Environmental Consequences: A Global Perspective.’ *Ambio*. 43(6). pp. 729-744.
- ❖ UNEP. (2016) *Radiation Effects and Sources*. Vienna, UNEP. Available from: <http://www.unscear.org/unscear/en/publications/booklet.html>.
- ❖ UNSCEAR. (2000) ‘Annex C: Exposures to the public from man-made sources of radiation.’ *Sources and Effects of Ionizing Radiation*. Vienna, UNSCEAR. http://www.unscear.org/unscear/en/publications/2000_1.html.

B. Threats Posed by Nuclear Harm to the Sustainable Development Agenda

Multilateral discussions of nuclear weapons have often taken place in forums focused on state-centric security, rather than humanitarianism, development and the environment. However, the ongoing humanitarian and environmental harms of nuclear weapons have a direct relevance to the 2030 Sustainable Development Agenda. According to Haoliang Xu, UNDP's Resident Representative in Kazakhstan the legacy of testing has stunted the Semipalatinsk region's sustainable development: 'Negative consequences include the degradation of environment, an increase in different diseases, decrease in the standard of living, economic depression and psychological difficulties....'⁸²

Several goals are directly relevant to addressing the specific harms caused by nuclear weapons. Assisting victims can contribute to Sustainable Development Goal (SDG) 1 '*End poverty in all its forms everywhere*' by ending marginalization, reducing survivors' health costs and aiding their capacity to earn a livelihood. Nuclear harm reduction is also directly relevant to SDG 3 '*Ensure healthy lives and promote well-being for all at all ages*', particularly Target 3.4 regarding the reduction of 'premature mortality from non-communicable diseases through prevention and treatment and promot[ing] mental health and well-being.' If organized in a non-discriminatory and empowering manner, victim assistance will contribute to SDG 5 '*Achieve gender equality and empower all women and girls.*'

Remediating environments by nuclear weapons activities contributes to SDG 3 on healthy lives, particularly Target 3.9 regarding the reduction 'of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.' It will also help meet SDG 6 '*Ensure availability and sustainable management of water and sanitation for all*,' SDG 14 '*Conserve and sustainably use the oceans, seas and marine resources for sustainable development*' and SDG 15 '*Protect, restore and promote sustainable use of terrestrial ecosystems....*'

In the run-up to the 2017 United Nations Oceans Conference, the Marshall Islands Student Association (MISA) at the University of the South Pacific in Fiji held public events and submitted artwork to the UN explicitly linking the ongoing environmental impact of nuclear testing to Target 14.1 regarding the reduction of 'marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.' Brooke Takala, a member of MISA whose father was displaced from Enewatak Atoll by the testing, stated 'If we have radiation leaking into our ocean and poisoning our food systems there's no food security, there's no water security, there's no maternal health, there are no opportunities.'⁸³

Moreover, the estimated \$100 billion of spent on nuclear weapons annually⁸⁴ represent, as the TPNW Preamble puts it, a 'waste of economic and human resources' that could be better directed to development. Indeed, progress on nuclear disarmament could free dividends for the pursuit of SDG 1 on poverty reduction, SDG 2 '*End hunger, achieve food security and improved nutrition and promote sustainable agriculture*' and SDG 10 '*Reduce inequality within and among countries.*' The resources spent on nuclear weapons each year are more than four times the amount of Official Development Assistance to all of Sub-Saharan Africa in 2016.⁸⁵ The continued existence of nuclear weapons also threatens SDG 16 '*Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.*'

For more detailed consideration of the relevance of the TPNW to sustainable development, see Erin Hunt's June 2017 report published by Pace University's International Disarmament Institute and Mines Action Canada.⁸⁶

C. Existing Capacities for Addressing Nuclear Harm

Humanitarian, development and environmental programming to address nuclear harm has not yet been seen as a singular, coordinated community of practice or field of action. It has remained fragmented across disciplinary and geographic boundaries. Nevertheless, relevant international, bilateral, national and local capacities do exist and should be built upon further.

i. International Programs

At the international level, since 1955, the UN Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) has compiled detailed technical research on the sources and effects of ionizing radiation,⁸⁷ including its landmark 2000 report on 'exposures to the public.'⁸⁸ In partnership with UN Environment, it has produced a plain language handbook on radiation in 11 languages that serves as a useful resource for developing risk reduction activities.⁸⁹

The International Atomic Energy Agency (IAEA) has conducted technical assessments of radiological conditions in a variety of key locations, including former test sites in Algeria,⁹⁰ Kazakhstan,⁹¹ and the Marshall Islands.⁹² The IAEA's Waste Technology Section (WTS) provides to its member states technical assistance in environmental remediation, including after nuclear accidents. WTS has a Mobile Unit for Site Characterization of Contaminated Land, which can deploy to sites as requested by states.⁹³ The IAEA has also established a Network of Environmental Management and Remediation (ENVIRONET) to coordinate among organizations engaged in environmental remediation of 'radiologically contaminated sites' and 'share...good remediation practices.'⁹⁴

In 2004, UNDP took over the UN's multi-agency response to the Chernobyl disaster, disseminating risk reduction information, providing policy advice and funding community development.⁹⁵ UNDP, in partnership with UNICEF, UNV and UNFPA and with Japanese government funding, has also supported a 'comprehensive rehabilitation' program at the former Soviet nuclear test site in Semipalatinsk, Kazakhstan, 'to ensure access to quality basic health and social services for vulnerable groups, ... build capacities for entrepreneurship and business skills, ... provide economic and employment opportunities and ... mobilize communities and support NGOs and CBOs'⁹⁶

ii. Bilateral Efforts

There have been several bilateral efforts to address nuclear harm. In 2015, then US Secretary of State John Kerry signed a statement of intent with Spain committing the US government to fund remediation of contaminated land at the Palomares site.⁹⁷ The governments of the US and Marshall Islands set up a Nuclear Claims Tribunal to assess applications for compensation for medical and property damage caused by nuclear testing. However, US Congress has refused to appropriate sufficient funds to cover what is owed to awardees; in 2016 there were \$45.8 million in unpaid claims.⁹⁸ US-sponsored environmental remediation of affected atolls in the Marshall Islands has proceeded very slowly.⁹⁹

The UK Ministry of Defence funded private contractors in 2004 to conduct hazardous waste remediation on Kiritimati Island, Kiribati. Other than radium dials on equipment, this waste was not radioactive.¹⁰⁰ The UK also paid £20 million to Australia in 1993 to compensate for the damage caused by its testing.¹⁰¹

iii. National Measures

At the national level, several countries have policies of compensation or care for survivors of harm from nuclear weapons activities. This has often been won by long struggles for recognition by civil society and community organizations. The Japanese government covers the medical expenses of *hibakusha* for all diseases linked to the atomic bombings. In 2015 these benefits were extended to 4,000 survivors living outside Japan, following a class action lawsuit by South Korean survivors.¹⁰²

The US Department of Justice has paid over \$2 billion to more than 31,000 downwinders, participants in nuclear tests and those engaged in uranium mining, milling and transportation under the Radiation Exposure Compensation Act (RECA).¹⁰³ The US government also has a system of remediating former military sites that have environmental contamination, including radioactive waste.¹⁰⁴

Following a campaign by the British Nuclear Test Veterans' Association (BNTVA), in April 2016 the UK government provided £25 million to set up a Nuclear Community Charity Fund, supporting research, care, education and memorialization efforts for British nuclear test veterans and their descendants.¹⁰⁵

In July 2017, the French government began reviewing earlier rejections of claims by survivors of testing in French Polynesia. The compensation policy had been widely criticized for its narrow definition of victims by civil society organizations, including the French test veteran association Association des Vétérans des Essais Nucléaires (AVEN) and Moruroa e Tatou, a French Polynesian organization advocating for the rights of victims.¹⁰⁶ The French Polynesian Assembly has established an online informational portal on French nuclear testing (moruroa.org).

However, as yet, 'no testing nation has extended such compensation beyond its own citizens', with the exception of the Marshall Islands Nuclear Claims Tribunal and UK.¹⁰⁷ This represents an ongoing disregard for the harm to people, particularly in indigenous communities far from the capitals of the nuclear-armed states.

As a result, several countries with populations of survivors have offered compensation, in the absence of assistance from the testing state. Surviving members of the 16,000 Australian troop contribution to the BCOF occupation of Hiroshima or the British nuclear test program are entitled to compensation, health care and a medal, awarded by the Australian government. Widow/ers may also receive assistance if their spouse died as a result of their exposure to the radiation.¹⁰⁸ This resulted from years of civil society mobilization.¹⁰⁹ Surviving members of the 12,000-strong New Zealand contribution to BCOF, as well as New Zealand soldiers exposed to radiation in the Kiribati or Moruroa tests, also receive assistance from their government.¹¹⁰ In the absence of compensation from the UK, in 2015 the Fijian government offered a small payment of less than \$5,000 each to the surviving Fijian veterans of UK nuclear tests in Kiribati.¹¹¹ This is considerably less compensation than is offered to nuclear test participants from Australian and New Zealand.

v. Civil Society Contributions

Civil society organizations have been pivotal in advocating for compensation and assistance to victims and environmental remediation at national and international levels. Civil society and community organizations have also been involved in service provision.

Since 1956, the *Nihon Hidankyo* (Confederation of A- and H- Bomb Sufferers) in Japan has fought for the rights of its member *hibakusha* to receive appropriate compensation and assistance.¹¹² Hibakusha Stories, an American NGO initiative, has contributed significantly to global awareness of the humanitarian impact of nuclear weapons, through educational efforts and aiding the participation of *hibakusha* in global nuclear disarmament policymaking.¹¹³

The Nuclear Free and Independent Pacific Movement, a pan-Pacific coalition of NGOs and faith institutions, founded in 1975, successfully campaigned for the Pacific Nuclear Weapons Free Zone (1985 Treaty of Rarotonga).¹¹⁴ Their 1983 ‘People’s Charter’, specifically called attention to nuclear testing’s threat to the environment.¹¹⁵ FemLINKPACIFIC, a Fijian non-profit, has raised awareness of the ongoing health complications suffered by Fijian nuclear test veterans.¹¹⁶ Moruroa e Tatou, which has 3,400 members in French Polynesia, has engaged in risk reduction education activities, including producing an informational booklet, *Moruroa: La Bombe et Nous* (Moruroa: The Bomb and Us).¹¹⁷ The association also successfully lobbied for the establishment of a nuclear testing memorial in Papeete, Tahiti, called *Place du 2-Juillet* or *Te kōhu kino*.¹¹⁸ Every year, Moruroa e Tatou holds a commemoration of the first nuclear test in French Polynesia at the memorial.¹¹⁹

Associations of nuclear test veterans exist in several countries, including the USA (National Association of Atomic Veterans), the UK (BNTVA), France (AVEN), Australia (Australian Nuclear Veterans Association) and New Zealand (New Zealand Nuclear Test Veteran's Association). BNTVA also has a Facebook support group for descendants of UK test veterans called the Fallout Group.¹²⁰

In the USA, environmental groups have sought to address the environmental damage caused by nuclear weapons activities. The Natural Resources Defense Council has filed lawsuits to encourage greater government attention to the environmental impact of nuclear waste.¹²¹ There are also numerous associations of downwinders, such as the Hanford Project, which has disseminated information on the consequences of nuclear weapons production at the Hanford Nuclear Reservation.¹²²

Governments have not always welcomed civil society efforts to call attention to nuclear harm. For example, the founder of *Planeta Nadezhda* (Planet of Hope), a Russian NGO supporting victims of the Kyshtym disaster, had to go into exile following state harassment.¹²³

At the global level, Chernobyl Children International provides humanitarian support to children in Ukraine, Belarus and Russia affected by the Chernobyl disaster.¹²⁴ The Nobel Peace Prize-winning International Campaign to Abolish Nuclear Weapons (ICAN) advocated for robust provisions on victim assistance and environmental remediation in the TPNW. Civil society organizations and academia produced numerous research reports and hosted side events on these positive obligations during the negotiations in New York.¹²⁵ The Toxic Remnants of War Network¹²⁶ and the

International Coalition to Ban Uranium Weapons (ICBUW),¹²⁷ both global civil society networks, have also conducted advocacy and produced research on persistent radiological legacies.

D. The TPNW as a Normative Framework for Humanitarian and Environmental Action

Despite its name, and the way that it has been discussed in the news media and policy circles, the TPNW is not only a prohibition treaty. It also has comprehensive ‘positive obligations’ that obligate states to recognize the rights of those who have been harmed by both past and future use and testing of nuclear weapons, address humanitarian harm and remediate contaminated environments.¹²⁸

The preamble of the TPNW expresses concern for the ‘catastrophic humanitarian consequences’ of a nuclear detonation that ‘cannot be adequately addressed, transcend national borders’ and pose ‘risks [to]... the security of all humanity.’ As such, nuclear weapons are ethically ‘abhorrent to the principles of humanity.’ The preamble acknowledges harm to the environment and asserts that the development, testing and use of nuclear weapons poses dangers to sustainable development, including ‘socioeconomic development, the global economy, food security and the health of current and future generations’ and has had disproportionate impacts on ‘women and girls’ and ‘indigenous peoples.’ The preamble also stresses the ‘importance of peace and disarmament education’ and ‘raising awareness of the risks and consequences of nuclear weapons for current and future generations.’

These concerns for addressing the human rights, humanitarian and environmental harm of nuclear weapons are reflected in the TPNW’s operative provisions. In Article 6(1), on victim assistance, the treaty’s negotiators agreed that:

Each State Party shall, with respect to individuals under its jurisdiction who are affected by the use or testing of nuclear weapons, in accordance with applicable international humanitarian and human rights law, adequately provide age-and gender-sensitive assistance, without discrimination, including medical care, rehabilitation and psychological support, as well as provide for their social and economic inclusion.

Similarly, Article 6(2) on environmental remediation says:

Each State Party, with respect to areas under its jurisdiction or control contaminated as a result of activities related to the testing or use of nuclear weapons or other nuclear explosive devices, shall take necessary and appropriate measures towards the environmental remediation of areas so contaminated.

To ensure implementation of these and other obligations, Article 5(1) requires states parties to ‘adopt the necessary measures to implement its obligations under this Treaty.’ They are required to hold regular Meetings of States Parties, which will ‘take decisions in respect of any matter with regard to the application or implementation of this Treaty’ (Article 8(1)).

To ensure that undue burden is not placed on affected states, Article 7 requires states parties to engage in ‘international cooperation and assistance’, including ‘technical, material and financial

assistance to States Parties affected by nuclear-weapons use or testing' (Article 7(3)). Such assistance, according to Article 7(5),

may be provided, inter alia, through the United Nations system, international, regional or national organizations or institutions, non-governmental organizations or institutions, the International Committee of the Red Cross, the International Federation of Red Cross and Red Crescent Societies, or national Red Cross and Red Crescent Societies, or on a bilateral basis.

Article 7(6) particularly encourages states parties that have 'used or tested nuclear weapons or any other nuclear explosive devices' to contribute to 'adequate assistance to affected States Parties, for the purpose of victim assistance and environmental remediation.'

The preamble expresses a commitment to 'the dissemination of the principles and norms of this Treaty.' This obligation to promote the treaty's norms is implied in Article 12, which commits states parties to 'encourage States not party to this Treaty to sign, ratify, accept, approve or accede to the Treaty, with the goal of universal adherence of all States to the Treaty.' As a result, states must not only promote the ban, but also the TPNW's positive obligations.

The TPNW is thus the most comprehensive international instrument addressing nuclear harms. It is crucial that supporters of the treaty engage in a robust campaign for its universalization and implementation of its prohibitions. However, it can also be used as a normative framework for humanitarian and environmental action on nuclear harm. Establishing administrative and normative structures based on the principles and legal mandates in the TPNW can be used to improve victim assistance, environmental remediation and disarmament education – even in states not party – and to upgrade donor engagement with addressing nuclear harm. While the TPNW's legal provisions do not explicitly extend to all nuclear harms (such as mining and peaceful uses of nuclear energy), the TPNW can be used to establish an international architecture for addressing nuclear harm. There is precedent for this. The MBT's demining provisions do not cover ERW and cluster munitions. However, the structures established to conduct humanitarian demining were used to address these problems before specific standalone legal instruments on ERW and cluster munitions were negotiated. Indeed, the TPNW requires that aid to victims and communities is not discriminatory (such as giving different levels of assistance to people harmed by nuclear weapons testing versus the meltdown of a nuclear power plant).

E. Learning Lessons from Implementing Other Humanitarian Disarmament Instruments

While TPNW places strong legal obligations on states parties to address the humanitarian and environmental harms of nuclear weapons, it has less detail on the administrative systems and structures for doing so than other humanitarian disarmament instruments. During the 2017 TPNW negotiations, delegates justified this decision to civil society advocates by stating that the available time for negotiation was very short and that once the legal obligations were in place, such arrangements could be addressed in national implementation measures and international Action Plans adopted at the Meetings of States Parties. It is thus crucial for effective implementation that TPNW learn lessons from the implementation of the MBT, CCM and ERW Protocol, as well as

other relevant instruments like the Arms Trade Treaty (ATT) and Programme of Action on Small Arms and Light Weapons (PoA). The emerging discussion on the Protection of the Environment in Relation to Armed Conflicts (PERAC), in both the International Law Commission and UN Environment Assembly, could also provide important input into TPNW implementation.

To help initiate this conversation, the author has outlined eight crucially important factors in the successful implementation of other humanitarian disarmament programs. The author has identified these factors in his 15 years of research on implementation of the MBT, CCM, ATT and PoA, in academia, for the *Landmine and Cluster Munition Monitor* and the Norwegian People's Aid's *Clearing the Mines* reports. He has conducted relevant fieldwork in Afghanistan, Bosnia, Cambodia, Croatia, Iraq, Kenya, Laos, Sudan, South Sudan, Uganda and Vietnam. He has also been a participant observer in global policymaking processes at the UN on a variety of disarmament and arms control issues, including landmines, cluster munitions, the arms trade, lethal autonomous weapons systems and nuclear weapons.¹²⁹ A draft of this report was also circulated to a variety of humanitarian disarmament stakeholders for comment.

The list of eight factors outlined below is admittedly not a comprehensive final word, nor is it intended to be a linear 'step-by-step' process. Rather it aims to spur conversations in the international community about the ways forward for implementing the TPNW's positive obligations.

i. Supporting Needs Assessment

During the TPNW negotiations, delegates and civil society became increasingly aware of the lack of sufficient data on the scope and scale of humanitarian, human rights and environmental harms caused by nuclear weapons activities. This lacuna is an indication of the lack of adequate political attention to these harms. The civil society campaign for the treaty, and the conferences on the humanitarian consequences of nuclear weapons in Oslo, Nayarit and Vienna helped to spur renewed research. However, much data was gathered in an effort to build a case for the treaty, not necessarily to establish systems of assistance.

This experience is similar to other humanitarian disarmament processes, in which civil society campaigns and new instruments focus political attention on specific harms, bringing together what were seen as disparate and disconnected problems under one framing. For example, the MBT and CCM provided the impetus to study the level of landmine, ERW and cluster munition contamination in a more systematic manner. They have led to the establishment of the *Landmine and Cluster Munition Monitor*, a civil society initiative that gathers comprehensive data on casualties and implementation of the MBT and CCM. There have also been Landmine Impact Surveys, as well as comprehensive technical and non-technical surveys on national and local levels. Much of this technical data has now been added to databases, using the Information Management System for Mine Action (IMSMA).¹³⁰

Therefore, as a crucial first step in implementing the TPNW's positive obligations, states parties must support a coordinated effort to conduct global, regional, national and local needs assessments on the humanitarian, human rights and environmental harms of nuclear weapons. This effort should also identify existing capacities within governments, international organizations, NGOs and community organizations. Ideally, at least a basic overview of needs should be available to present to the TPNW's First Meeting of States Parties to provide impetus for strong political action for

implementation. In their statements to Meetings of States Parties (and the UN General Assembly's First Committee on disarmament and international security), delegates should also provide details on the scope of nuclear harm in their country and victim assistance and environmental remediation efforts. Ideally, this should not only be limited to nuclear weapons use and testing but include other forms of nuclear harm. States parties should also consider establishing contingency plans for emergency assessment in the event of future nuclear weapons use or testing.

ii. Ensuring Participation of Survivors and Affected Communities

The humanitarian disarmament community has aimed to ensure the meaningful participation of survivors and affected communities in all elements of global policymaking on landmines, cluster munitions, ERW, the arms trade and now nuclear weapons. Global civil society campaigns have forefronted the voices of survivors in statements at the UN, in negotiating forums and at meetings of states parties. They have also called on states to include survivors in their delegations. As Erin Hunt of Mines Action Canada has argued, activists and diplomats must remember the principle of 'nothing about us without us': 'survivors should have a say in policies, laws and programs that impact their lives.'¹³¹ Pressure from ICAN ensured the inclusion of presentations by *hibakusha* and survivors of testing in the Marshall Islands, Australia and USA at the Nayarit and Vienna conferences.¹³² They also featured survivor testimony in the TNPW negotiations.

As a result, states and civil society should not only consult with survivors and affected communities when implementing the TPNW's positive obligations, they should include their active participation. To lay the foundations for such engagement, it is important for states, international organizations and civil society to support associations and networks of survivors, to build their capacity in advocacy and service provision.

The mine action community has also encouraged inclusion of survivors in implementation of the MBT and CCM's positive obligations. Several mine action organizations actively recruit survivors to work in victim assistance, mine risk education or as deminers.¹³³ Similarly, TPNW victim assistance and environmental remediation programs should have affirmative policies encouraging the employment of affected people.

iii. Establishing Rigorous National Implementation Measures

Effective landmine, ERW and cluster munition clearance, risk reduction education and victim assistance has depended on the establishment of strong governance systems at the national level, professional staffing and focused political attention. Therefore, donors have supported building the capacity of national institutions to manage, regulate and implement obligations. Support to local civil society advocacy and technical assistance programs has also contributed to more rigorous implementation. NGOs have often operationalized national measures by implementing mine action projects.

The MBT and CCM actually outline crucial national measures in their operative legal provisions. Such measures were not included in the TPNW text. However, they could provide an analogous 'roadmap' or checklist for the establishment of national implementation measures for the TPNW's positive obligations. For example, the CCM's Article 4(2) requires affected states parties to take the following measures to address the threat of cluster munitions:

- (a) Survey, assess and record the threat posed by cluster munition remnants, making every effort to identify all cluster munition contaminated areas under its jurisdiction or control;
- (b) Assess and prioritise needs in terms of marking, protection of civilians, clearance and destruction, and take steps to mobilise resources and develop a national plan to carry out these activities, building, where appropriate, upon existing structures, experiences and methodologies;
- (c) Take all feasible steps to ensure that all cluster munition contaminated areas under its jurisdiction or control are perimeter-marked, monitored and protected by fencing or other means to ensure the effective exclusion of civilians. Warning signs based on methods of marking readily recognisable by the affected community should be utilised in the marking of suspected hazardous areas. Signs and other hazardous area boundary markers should, as far as possible, be visible, legible, durable and resistant to environmental effects and should clearly identify which side of the marked boundary is considered to be within the cluster munition contaminated areas and which side is considered to be safe;
- (d) Clear and destroy all cluster munition remnants located in areas under its jurisdiction or control; and
- (e) Conduct risk reduction education to ensure awareness among civilians living in or around cluster munition contaminated areas of the risks posed by such remnants.

CCM's Article 5(2) provides similarly detailed instructions for implementing victim's assistance:

- (a) Assess the needs of cluster munition victims;
- (b) Develop, implement and enforce any necessary national laws and policies;
- (c) Develop a national plan and budget, including timeframes to carry out these activities, with a view to incorporating them within the existing national disability, development and human rights frameworks and mechanisms, while respecting the specific role and contribution of relevant actors;
- (d) Take steps to mobilise national and international resources;
- (e) Not discriminate against or among cluster munition victims, or between cluster munition victims and those who have suffered injuries or disabilities from other causes; differences in treatment should be based only on medical, rehabilitative, psychological or socio-economic needs;
- (f) Closely consult with and actively involve cluster munition victims and their representative organisations;
- (g) Designate a focal point within the government for coordination of matters relating to the implementation of this Article; and
- (h) Strive to incorporate relevant guidelines and good practices including in the areas of medical care, rehabilitation and psychological support, as well as social and economic inclusion.

TPNW states parties should adopt similar measures to implement positive obligations, including administrative structures, policies, focal points and standards. One way to encourage broad adoption of such comprehensive measures would be to promote model legislation in universalization efforts.

iv. Formulating International Action Plans

Another way to enumerate necessary measures is through the adoption of international Action Plans at the TPNW Meetings of States Parties. Such documents could be annexed to any outcome documents negotiated at the meetings and used to coordinate and guide both national implementation and international cooperation and assistance on victim assistance, environmental remediation and disarmament education/universalization.

One useful model is the 2014 Maputo Action Plan, adopted by the Third Review Conference of the MBT, in which states parties committed to specific actions in support of the treaty's universalization, destruction of landmine stockpiles, landmine clearance, victim assistance, international cooperation and assistance and transparency measures. For example, the Maputo Action Plan's paragraphs on international cooperation and assistance provides a comprehensive normative framework to which states parties can be held accountable (Paragraphs 7(a to f)):

(a) Each State Party seeking assistance will do its utmost to demonstrate high level national ownership in fulfilling Convention obligations, including by: maintaining interest at a high level in fulfilling Convention obligations; empowering and providing relevant State entities with the human, financial and material capacity to carry out their obligations under the Convention; articulating the measures its State entities will undertake to implement relevant aspects of Convention in the most inclusive, efficient and expedient manner possible and plans to overcome any challenges that need to be addressed; and making a regular significant national financial commitment to the State's programmes to implement the Convention.

(b) All States Parties in a position to do so will effectively use all possible avenues to support States Parties seeking to receive assistance in mine clearance; mine risk education; stockpile destruction; adopting appropriate national implementation measures; as well as meeting victims' needs and guaranteeing their rights. As concerns victim assistance, this includes providing targeted assistance and supporting broader efforts to enhance frameworks related to the rights of persons with disabilities, health, education, employment, development and poverty reduction.

(c) States Parties in a position to provide assistance and those seeking to receive assistance, where relevant and to the extent possible, will enter into partnerships for completion, with partners specifying their responsibilities to each other, articulating age and gender-sensitive time-bound objectives and targets, making financial or other commitments, if possible on a multi-year basis, and engaging regularly in a dialogue on progress and challenges in meeting goals.

(d) States Parties in a position to provide assistance will support plans and programmes that are informed by relevant and accurate information on contamination and the socio-economic impact of anti-personnel mines – including information which is collected from affected women, girls, boys and men, and is analysed from a gender perspective – and that promote and encourage gender mainstreaming.

(e) All States Parties will develop and promote bilateral, regional and international cooperation, including through South-South cooperation and by sharing national

experiences and good practices, resources, technology and expertise to implement the Convention.

(f) All States Parties will contribute, as they deem useful, to the information exchange tool 'Platform for Partnerships' and will provide new or updated information on their needs for assistance or on assistance which they are in a position to offer, when feasible, with a view to further enhancing partnerships and to supporting the full implementation of the Convention.

States parties of the CCM adopted similar commitments in the Vientiane Action Plan at its First Meeting of States Parties in 2010,¹³⁴ as well as the Dubrovnik Action Plan adopted at the CCM's First Review Conference in 2015.¹³⁵

v. Convening International Discussions on Governing Principles and Quality Standards

The CCM's Article 4(3) requires states to 'take into account international standards' in clearance activities. Unfortunately, no analogous provision was included in the TPNW text. It is thus crucial that TPNW members engage in conversations, ideally mandated by the First Meeting of States Parties, on the quality standards by which victim assistance, risk reduction education and environmental remediation will be judged. Otherwise, it will be difficult to ascertain whether affected states are fulfilling their obligations. The IAEA has developed safety standards for environmental remediation,¹³⁶ though debate continues about acceptable levels of safe exposure to radiation.¹³⁷ The International Mine Action Standards (IMAS) may also be a useful model,¹³⁸ including the lengthy debates that have developed and revised them over time. IMAS also includes standards on mine/ERW risk education.¹³⁹ Though not a formal addition to IMAS, the experts mandated with their development issued a 'Technical Note' guiding 'Clearance of Depleted Uranium Hazards' in 2015.¹⁴⁰ While IMAS does not cover mine/ERW victim assistance, the UN's 'Policy on Victim Assistance in Mine Action'¹⁴¹ could be drawn on to develop normative standards for assisting victims of nuclear harm. The ICBL has also developed 'Guiding Principles for Victim Assistance.'¹⁴² Another potentially relevant model is the ongoing development of technical guidance for management of contaminated sites in the Mercury Convention.¹⁴³

In addition to technical standard-setting, the experience of implementing the MBT, ERW Protocol and CCM's positive obligations has shown that it is also important to develop governing principles rooted in international humanitarian, human rights and environmental norms. For example, in 1997 mine action experts associated with the International Campaign to Ban Landmines (ICBL) adopted in Bad Honnef, Germany a document called 'Mine Action Programmes from a Development-oriented Point of View.' Known as the 'Bad Honnef Framework,' it focused the attention of the mine action sector on addressing 'the social fabric...and the economic foundations of the country.' In doing so, it addressed concerns that mine action could often be distracted by technical myopia or hijacked by state security and commercial interests. In Bad Honnef, the mine action experts agreed that their work should be guided by three principles:

1. '*Participation*': 'the needs and aspirations of those people affected by mines and not the particular interests of the funders must be the starting point for all endeavours...'
2. '*Coherence*': Mine action programs should involve 'an integrated consideration of all the areas of activity aiming at rebuilding and a resumption of peace....'

3. '*Solidarity*': Assistance is aimed at 'the encouragement of autonomy' for victims and affected communities, rather than 'new dependencies.'¹⁴⁴

The UN has also developed global frameworks to guide mine action programs that could be useful models for guiding implementation of the TPNW's positive obligations. For example the UN's 2013-2018 'Strategy on Mine Action' outlines the following Vision and Mission:

Vision:

The vision of the United Nations is a world free of the threat of mines and explosive remnants of war (ERW), including cluster munitions, where individuals and communities live in a safe environment conducive to development and where the human rights and the needs of mine and ERW victims are met and survivors are fully integrated as equal members of their societies.

Mission:

The United Nations works with affected states to reduce the threat and impact of mines and ERW, including cluster munitions, on peace and security, humanitarian relief, human rights, and socio-economic development; It does so in partnership with civil society, the private sector, international and regional arrangements, and donors with an aim to secure levels of prevention and protection for individuals and communities, at which point UN mine action assistance is no longer requested.

The strategy has four strategic objectives (each of which has designated indicators of success):

1. Risks to individuals and the socio-economic impacts of mines and ERW, including cluster munitions, are reduced.
2. Comprehensive support is provided by national and international actors to mine and ERW victims within broader responses to injury and disability.
3. The transfer of mine action functions to national actors is accelerated, with national capacity to fulfill mine action responsibilities increased.
4. Mine action is promoted and integrated in multilateral instruments and frameworks as well as national plans and legislation.

And four 'cross-cutting functions and activities':

1. '*Coordination*': 'to improve the coherence, effectiveness and impact of collective responses'
2. '*Capacity development*': 'to support affected states in fulfilling their responsibilities and reinforce national ownership'
3. '*Data collection and analysis*'; 'to support national and international decision-making and the efficient and effective allocation of resources'
4. '*Advocacy*': 'for global and national mine action goals, including for treaty universalization and implementation... and the provision of adequate and reliable funding support.'

In mainstreaming gender across efforts addressing nuclear harm, the UN's *Gender Guidelines for Mine Action Programmes* would be an appropriate source of guidance.¹⁴⁵

vi. Encouraging Donor Engagement, Inviting Participation of States Not Party

One of the most impressive normative impacts of the MBT and CCM has been their attraction of donor attention to the humanitarian, human rights and development implications of landmine and ERW contamination. Through coordination structures like the informal Intersessional Meetings of the MBT, which bring together mine action advocates, professionals and diplomats to discuss technical and administrative matters, it has encouraged states not party to engage in nevertheless addressing the harms caused by mines, cluster munitions and other ERW.¹⁴⁶ For example, the US government, though not a state party to the MBT nor CCM, is the world's biggest donor to mine action programs.¹⁴⁷ In interviews with mine action professionals over the last 15 years, I have heard many say that contacts established through working on mine action funding has often made officials in states not party more sympathetic to the norms of the MBT and CCM.

In implementing the TPNW's positive obligations, states party should therefore consider how to establish mechanisms for funding (like the ATT's Voluntary Trust Fund¹⁴⁸) that draw in a wide variety of countries providing foreign aid. Countries affected by nuclear harm that are also OECD DAC recipients (such as Algeria, China, Fiji, Kazakhstan, Kiribati, Marshall Islands, Ukraine, Uzbekistan and Turkmenistan) should include victim assistance and environmental remediation in their proposals for Official Development Assistance. A potential model is the UN's 'Portfolio of Mine Action Projects', which provides a list of projects around the world – reviewed by a UN inter-agency team – which require funding. It can be 'searched according to location, area or work or the amount of funding required.'¹⁴⁹

The mine action sector also successfully mobilized private funding, in part because of the active involvement of NGO implementing agencies like DanChurchAid, Danish Demining Group, Handicap International, the HALO Trust, Mines Advisory Group (MAG) and Norwegian People's Aid. While no longer functional, the Adopt-a-Minefield program raised \$25 million in private resources for mine action.¹⁵⁰

vii. Building a Community of Practice

The many organizations and officials engaged in mine action have cultivated a global community of practice that actively shares information, experience and technical data across programs. There are formal meetings like the Intersessional Meetings of the MBT, usually held in Geneva, as well as technical conferences. James Madison University's Center for International Stabilization and Recovery edits *The Journal of Conventional Weapons Destruction* (formerly the *Journal of Mine Action*), which serves as a kind of trade publication for mine action operators.¹⁵¹ The sector is also supported by the Geneva International Center for Humanitarian Demining (GICHD), which serves as a technical and policy thinktank. More informally, there are many email listserves serving the mine action sector.

UNDP has supported 'South-South' cooperation through a program of Mine Action Exchanges (MAX), in which mine action professionals from affected countries visit other mine action programs around the world.¹⁵² Cranfield University's Centre for International Security and Resilience has run numerous courses for senior managers of mine action programs.

Developing a similar community for sharing technical information and professional experiences will be crucial to the successful implementation of the TPNW's positive obligations.

viii. Establishing Systems to Monitor and Evaluate Progress

Finally, implementation of the MBT and CCM has been tracked thoroughly by the *Landmine and Cluster Munition Monitor*, the de facto monitoring and verification system for both treaties, run by the global civil society networks that campaigned for them.¹⁵³ The *Monitor* includes sections specifically dedicated to tracking the clearance of minefields and cluster munition strike sites, assistance to victims and casualty statistics. The Control Arms coalition drew on this model when they established the *ATT Monitor*.¹⁵⁴ Both of these reporting systems would not be possible without support from governments and other major donors.

Whether or not such a comprehensive monitoring report is established for the TPNW, states, international organizations and civil society should create some system of global tracking of both the scope of nuclear harm and efforts to address it.

About the Author

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Annex: Preliminary List of Potential and Confirmed Countries Affected by Harm from Nuclear Weapons Activities

Note that the data listed below are the result of a preliminary desk study and should be seen as indicative only of what is easily publically accessible. It is important also to note that estimates of ‘survivors’ are often low, focused on medical (rather than psychological) effects on the first-generation of survivors and limited to those that have received official recognition from their governments (often a difficult process). This is therefore intended to catalyze further research and needs assessment, not to be a definitive list. Unless otherwise cited, information on tests and indicators of impact replicate what is stated in section A. Where the author was unable to find reliable data online, he has stated that the scope of harm is unconfirmed. This should not be taken as an indicator of the scale of the problem. The table only includes the top six uranium mining countries; a more comprehensive future survey should include other uranium mining locations. The table does not include states affected by depleted uranium ammunition hazards.¹⁵⁵

Country/ Territory	Incidents and Locations	Indicators of Humanitarian & Environmental Impact	OECD DAC Recipient?	Position on TPNW
Algeria	4 French tests at Reggane and 13 at Ekker	Significant contamination of desert sand; elevated radiation near test sites	Yes	Signatory
Australia	PoWs and BCOF soldiers exposed in Hiroshima and Nagasaki 12 UK tests at Maralinga, Emu Field, and the Montebello Islands, plus 600 ‘minor trials’ at Maralinga Uranium mining	16,000 Australian troops exposed Australian government recognized 16,716 Australian participants in UK nuclear tests. Environmental contamination blocks access of indigenous people to traditional lands.	No	Boycotted negotiations
Bangladesh	BCOF soldiers exposed in Hiroshima (Unconfirmed)	Unconfirmed number of soldiers in the Indian contingent	Yes	Signatory
Belarus	Fallout from Chernobyl disaster	Almost entire country exposed to fallout, 400,000 people displaced. 2 million people still in contaminated zones.	Yes	Did not participate in negotiations
Canada	Fallout from Soviet tests in Novaya Zemliya Participation in US and UK tests Uranium mining	Scope of harm unconfirmed Approximately 700 Canadian troops participated in tests. ¹⁵⁶	No	Boycotted negotiations
China	23 atmospheric and 22 underground tests at Lop Nur	1.2 million exposed to elevated radiation doses high enough to induce cancer	Yes	Boycotted negotiations
Democratic People’s Republic of Korea	6 underground tests	Scope of harm unconfirmed	Yes	Boycotted negotiations
Greenland (Denmark)	Nuclear weapons accident at Thule Air Force Base	500,000 gallons of contaminated water had to be removed.	No	Denmark boycotted negotiations

Country/ Territory	Incidents and Locations	Indicators of Humanitarian & Environmental Impact	OECD DAC Recipient?	Position on TPNW
India	6 underground tests BCOF soldiers exposed in Hiroshima	Scope of harm from testing unconfirmed Unconfirmed number of troops exposed	Yes	Boycotted negotiations
Fiji	Fijian troops participated in UK tests in Kiribati	In 2015 there were 24 surviving of 100-500 test veterans; many suffer multi-generational medical complications	Yes	Signatory
Finland	Fallout from Chernobyl disaster	Contaminated reindeer meat detected.	No	Boycotted negotiations
French Polynesia (France)	179 French tests at Moruroa Atoll and 14 at Fangataufa Atoll	Increased cancer rates in local populations and former test site workers, environmental damage to atolls	No	France boycotted negotiations
Japan	Atomic bombing of Hiroshima and Nagasaki Luck Dragon 5 crew exposed to 1954 US test in the Marshall Islands	164,000 <i>hibakusha</i> in Japan in March 2017 Crew exposed to fall out, contaminated tuna sold in Osaka.	No	Boycotted negotiations
Kazakhstan	456 nuclear devices tested at Semipalatinsk site Fallout from Chinese tests at Lop Nur	At least 200,000 residents exposed to testing. Destruction of the environment. Elevated cancer risks.	Yes	Voted in favor of adoption
Kiribati	9 UK nuclear tests at Malden Island and Kiritimati Island 24 US tests at Kiritimati Island	Unconfirmed number of local people present during tests. Many seabirds killed. Radioactive waste dumped in ocean.	Yes	Signatory
Republic of Korea	Korean nationals exposed to atomic bombing of Hiroshima and Nagasaki	30,000 Korean nationals survived Hiroshima and Nagasaki bombings, 22,000 were killed.	No	Boycotted negotiations
Marshall Islands	66 US tests in the Bikini and Enewetak Atolls	Displacement of people, exposure to radiation and extensive environmental damage to the Bikini, Enewetak and Rongelap Atolls	Yes	Voted in favor of adoption
Netherlands	Dutch PoWs exposed to atomic bombing of Hiroshima and Nagasaki	Number of affected troops unconfirmed	No	Voted against adoption

Country/ Territory	Incidents and Locations	Indicators of Humanitarian & Environmental Impact	OECD DAC Recipient?	Position on TPNW
New Zealand	DCOF soldiers exposed in Hiroshima Soldiers deployed to UK test sites New Zealand Navy frigates protesting 1973 Moruoa tests	12,000 New Zealand troops exposed 11 New Zealand troops participated in tests in Australia, others participated in Kiribati tests 551 New Zealand naval personnel may have been exposed to radiation. Multigenerational health problems observed	No	Signatory
Niger	Uranium mining	Greenpeace claims residents near mines are exposed to elevated radiation	Yes	Attended parts of negotiations, did not vote on adoption. Voted in favor of UNGA resolution establishing negotiation.
Norway	Fallout from Soviet tests in Novaya Zemliya	Scientific studies show health impacts on those exposed <i>in utero</i> . Potential elevation of thyroid cancer rates	No	Boycotted negotiations
Pakistan	DCOF soldiers exposed in Hiroshima (unconfirmed) 6 underground tests	Unconfirmed number of soldiers in the Indian contingent Scope of harm from testing unconfirmed	Yes	Boycotted negotiations
Russia	130 nuclear tests at Novaya Zemlya plus additional tests elsewhere on the mainland Kyshtyn nuclear waste facility accident Fallout from Chernobyl disaster Uranium mining	Displacement of 500 indigenous people. Destruction of reindeer population. Radioactive fallout contamination Radioactive material scattered over 20,000 km ² and 270,000 people	No	Boycotted negotiations
Spain	Nuclear weapons accident over Palomares	Contaminated the village with plutonium, has depressed agricultural market.	No	Boycotted negotiations
Sweden	Fallout from Soviet tests in Novaya Zemliya Fallout from Chernobyl disaster	Potential elevation of thyroid cancer rates Contaminated reindeer meat detected.	No	Voted in favor of adoption

Country/ Territory	Incidents and Locations	Indicators of Humanitarian & Environmental Impact	OECD DAC Recipient?	Position on TPNW
Turkmenistan	1972 Soviet nuclear explosion in Krater ¹⁵⁷		Yes	Did not attend negotiation, but voted in favor of UNGA resolution establishing negotiation.
Ukraine	1972 and 1981 Soviet nuclear explosions ¹⁵⁸ Chernobyl nuclear power and weapons fuel production plant disaster	Extensive humanitarian and environmental damage	Yes	Boycotted negotiations
United Kingdom	PoWs and BCOF soldiers exposed in Hiroshima Soldiers exposed to tests in Australia and Kiribati	Several thousand British troops exposed 21,357 British personnel participated in the tests. Multigenerational health problems observed.	No	Boycotted negotiations
United States of America	PoWs, Japanese Americans and occupying troops exposed in Hiroshima and Nagasaki 1,040 nuclear detonations in 945 tests in continental USA, 12 at Johnston Island (a US territory) Uranium mining, milling and transportation Radioactive waste Human radioactivity experiments Fallout from Soviet tests in Novaya Zemliya in Alaska	195,000 US troops exposed at Hiroshima and Nagasaki. 1,000 Japanese American <i>hibakusha</i> in 2014 US government has awarded compensation to 3,963 'onsite participants' in nuclear tests and 19,555 'downwinders'. More than 210,000 US troops participated in testing program. Groundwater contamination at Nevada Test Site US government has awarded compensation to 8,215 uranium mining, milling and transportation workers Communities near waste storage at risk Human rights of vulnerable hospital patients and prisoners violated. Scope of harm unconfirmed	No	Boycotted negotiations

Country/ Territory	Incidents and Locations	Indicators of Humanitarian & Environmental Impact	OECD DAC Recipient?	Position on TPNW
Uzbekistan	1966 and 1968 Soviet nuclear explosions ¹⁵⁹		Yes	Attended parts of negotiations, did not vote on adoption. Voted in favor of UNGA resolution establishing negotiation.

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