



**Open-ended Working Group taking forward
multilateral nuclear disarmament negotiations¹****Geneva 2016**

Item 5 of the agenda

Taking forward multilateral nuclear disarmament negotiations**Nuclear Disarmament in context - a global governance issue****Submitted by Ireland**

1. This working paper is submitted for consideration in accordance with the mandate of the Open-ended Working Group as drawn from operative paragraph 3 of the resolution “Taking forward multilateral nuclear disarmament negotiations” and specifically the issues relating to risk, transparency and raising awareness. It builds on the discussions at the February session of the Open-ended Working Group and is associated with the consultation paper prepared by Chatham House, “Nuclear Disarmament: the Missing Link in Multilateralism”.
2. This is a time of global uncertainty, strain and threat. All of our institutions, allegiances and assumptions are under challenge. The existence of nuclear weapons does nothing to protect us or to make the world a safer place in such tense and sensitive circumstances; in fact, as we heard in compelling presentations from the expert panellists in February, the inherent risks of nuclear weapons makes the world even more dangerous.
3. Our meetings in February generated useful and focused discussions with broad agreement on the need for enhanced transparency and risk reduction measures. We welcome the elements set out in the Chair’s synthesis paper of 21 April 2016.
4. With regard to transparency, we note that States who participated in the Panel 2 discussions stressed the importance and the need for greater transparency regarding nuclear arsenals and measures to safeguard them.
5. While acknowledging that some nuclear-weapon States are providing greater levels of information and transparency than others, the levels of information provided remains insufficient and uneven. Adoption of the common reporting template already developed and proposed by the Non-Proliferation and Disarmament Initiative (NPDI), would encourage

¹ Established pursuant to resolution 70/33 of the General Assembly of the United Nations.



best practice and ensure that all nuclear-weapon States provide the same and better levels of information.

6. While building and expanding on the reporting commitments undertaken in the context of the NPT was one option which was shared by those who spoke, another useful recommendation made by many States related to the possibility of developing measures on transparency which could be adopted also by those nuclear-weapon States outside the NPT. Ireland supports such calls and looks forward to full engagement with the nuclear-weapon possessor States on this important issue. We believe that this should be one of the key out workings of this Open-ended Working Group leading to clear and concrete recommendations in the final report.

7. In February, we also received detailed, well-documented and disquieting presentations from experts on the current level of risk and the need for urgent action. We all know and agree that the only action which can truly address the risk is the prohibition and elimination of nuclear weapons. However, given that this is likely to take some time to achieve, mitigation against current risk levels must be put in place as a matter of urgency.

8. The risk of a nuclear detonation, either by accident or on purpose, is probably higher now than it ever was. Indefinite retention means inevitable catastrophe. The longer nuclear weapons remain and the more complacency there is about them, the more likely it is that an accident will occur. There have been numerous documented near-misses and these are just the incidents that became public knowledge.

9. A particular risk which Ireland would wish to highlight is in the area of growing automation of weapons systems, an issue which is currently the subject of considerable attention in the conventional weapons field. In view of the evidence that many accidental nuclear weapon detonations were avoided in the past largely due to human agency and intervention, this is an area of increased risk which needs to be highlighted also in regard to the continued reliance on nuclear weapons in security doctrines.

10. While we value all efforts at enhanced nuclear safety and welcome moves towards risk reduction and greater transparency, we believe that it is also important to underline that addressing the risks should not serve to suggest any support for the indefinite retention of the core cause. Most recently, we witnessed the Nuclear Security Summit in Washington acknowledge all of the risks inherent in nuclear material. However, the discussions took place in the context of the safest ways to continue holding onto nuclear weapons.

11. Every day that nuclear weapons continue to exist is a day when they could potentially be detonated, either on purpose or by accident or accessed by rogue actors. Regrettably, the level of interest and attention being directed at nuclear disarmament, at national and international levels, remains in stark contrast with the urgency surrounding this level of risk.

12. An important and integral part of the work of this Open-ended Working Group has to be in the area of increasing awareness and generating informed public and political concern, both in order to address current risks but also to mobilise action for future change.

13. In this respect Ireland has been particularly active with regard to the question of raising awareness in relation to the gendered impact of ionising radiation. Ireland believes it is vitally important to continue raising awareness and contributing to knowledge around this hitherto little appreciated aspect of nuclear weapons use. A nuclear detonation of any size will impact hugely on all human beings exposed to its radiation, but more so on women than on men and on girl children more than boy children. This aspect of these weapons needs greater visibility and Ireland hopes that the Open-ended Working Group final recommendations will reflect the importance of this matter.

14. The Economist Intelligence Unit/EIU global forecast in March made for stark reading, with a focus on rising international tensions and the very real potential for escalation, coupled with the possibilities of accidents and miscalculations. In addition, we see the increasing prominence of nuclear weapons in security doctrines and ongoing significant investment in modernisation, much of which would have the effect of actually making it easier to use nuclear weapons. Against such a backdrop, the deliberations of this Open-ended Working Group are both timely and pressing.

15. Last year saw two ground breaking international agreements, one on the Sustainable Development Goals (SDGs) and one on climate, examples of what is possible when we work together, face up to reality and focus on the future. But those agreements exist under the shadow of a potential nuclear detonation, which puts their success at risk. This is a small planet, getting smaller every day. Our concept of the world as a vast and unconnected place has shifted to one where everything is interlinked. In such a world, multilateralism plays a key role and questions of security impact not just nationally but on us all.

16. Therefore, in terms of the sustainability of our planet and collective human security, there has never been a greater need for more joined-up thinking and global governance. Good progress was made with the SDGs and the Climate Agreement. But these agreements are overshadowed by the lack of progress on nuclear disarmament and all of their objectives are threatened by the risks associated with the continued existence of and reliance on nuclear arsenals.

17. In this context, nuclear disarmament is not a side issue; it is not a technical or specialist debate and it should not be addressed as such. This issue is in fact an integral and horizontal one which has the potential to impact on all citizens and which therefore needs to be integrated with policy making in all other areas which have a global impact. Whatever the issue that concerns us, be it migration or food security, cyber terrorism or global warming, human rights or gender equality, the potential negative impact is heightened by the complicating factor of nuclear weapons.

18. With all of this in mind and in order to contribute substantively to this session, Ireland has been pleased to commission a new consultation paper from Chatham House, setting out how nuclear disarmament is essentially the missing piece in the global governance jigsaw and why and how this must be addressed now.

19. The key points which we would wish to highlight from that research are as follows. The paper presents nuclear disarmament as a fundamentally interconnected issue. This is a time of great challenge, on the global stage, for nations and for all of humanity. It is therefore a time for leadership and a time to accept our international obligations, our commitments and our responsibilities. Nuclear disarmament must be viewed in a global context and if we are genuinely concerned about the sustainability of the planet then we need to be equally concerned about nuclear issues. Therefore, the commitments we make under other international agreements also impact on the commitments we must make, and must fulfil, around nuclear disarmament.

20. It is time to embed nuclear disarmament as a horizontal issue, recognising its impacts on broader rights and entitlements, as well as on obligations and responsibility. We need to generate informed public concern, which in turn will serve to drive the necessary political will.

21. More joined up multilateralism, which includes a greater understanding of the comprehensive and interconnected nature of our international obligations and how nuclear disarmament is inextricably linked, will lead ultimately to this being rightly treated as a horizontal, top table, global governance issue.

22. The paper sets out the ways in which nuclear weapons would have disastrous impacts on a whole set of issues in which the possibility of nuclear weapons use is not currently discussed or factored in to policy-making. These top-table issues include: the SDGs, climate change, the environment, development, gender, children's rights, protection of cultural heritage, public health, non-state armed groups, humanitarian action and cyber security.

23. The paper makes the case that those who are concerned about the survivability of the planet and the betterment of humanity, need to be equally concerned about nuclear weapons. The international commitments and obligations that countries have made on those top-table issues need to be explicitly linked to the international commitments and obligations on nuclear weapons and the disappointing lack of action on same. Leaving nuclear disarmament and non-proliferation obligations unfulfilled will have severe impact on all the efforts underway to address climate and environmental issues, SDG implementation and other measures.

24. The paper reaches a number of important conclusions that should resonate beyond this Open-ended Working Group and into the wider policy arena. These include: connecting expert and diplomatic communities across the range of issues to yield new perspectives, synergies and practical ideas, following through on the links between disarmament and development, recognising the vital role of women in disarmament, acting on the connection between nuclear disarmament and the protection of cultural heritage, renewing action between the nuclear disarmament community and public health experts, joining the dots between nuclear disarmament and nuclear safety, exposing the cyber vulnerabilities not just of civilian nuclear material but that in military use and using the World Humanitarian Summit as a model of how nuclear disarmament can take its place among the most significant global challenges of our time.

25. The paper suggests that progress, or the lack of it, on nuclear disarmament should be factored in to monitoring progress on the SDGs and that experts and officials working on global threats would benefit from including nuclear disarmament in their perspective and that all of these issues should be taken forward by the United Nations in a cross-sectoral approach, including joint studies, working papers, meetings and exchanges of knowledge between relevant committees.

26. The paper also proposes that the vulnerabilities and risks associated with nuclear weapons be taken into account in all security and emergency planning and that a response to a nuclear detonation should be included in all risk management and mitigation processes, as well as recommending an examination of the capacity for a humanitarian response to such a nuclear detonation and noting the particular responsibility of the nuclear weapon states and those who have nuclear weapons on their territory, in this regard.

27. Fundamentally, the consultation paper supports Ireland's view that nuclear disarmament and the legal framework pertaining to it can therefore be truly characterised as the missing piece of the global governance jigsaw.

28. Ireland hopes that participants in the Open-ended Working Group will share our view, supported by the consultation paper, on the need for an enhanced awareness of the interconnected nature of the nuclear disarmament agenda and the importance of elevating this to the highest levels of our global governance. This is no time for business as usual, this is a time for informed concern and for collective action.

29. We would like to see this approach discussed further at the Open-ended Working Group and reflected in the recommendations contained in the final report.

Annex

Nuclear Disarmament: the Missing Link in Multilateralism¹

Summary

The purpose of this paper is to outline the connections between nuclear disarmament and some of the other most important issues facing humanity today. Enormous effort has been invested in, for example, climate change prevention and mitigation, socio-economic development, and establishing and implementing the rule of law. Recent efforts over the protection of cultural heritage in conflict, stemming the rise of terrorism, developing cyber security, understanding gendered impacts and addressing urgent public health issues have all benefited from energized governmental and non-governmental diplomatic movements.

A single detonation of a nuclear weapon would have disastrous impacts on these vitally important issues, yet the possibility of nuclear weapons use is rarely factored into policy-making in these arenas. Experts and officials who work on these headline issues are often unaware of the dangers that nuclear weapons still pose. There is a persistent belief that the risks associated with nuclear weapons are no longer as high as they were during the Cold War. There is also a belief that nuclear disarmament is under way and therefore no longer requires the same level of attention. Furthermore, perhaps because of these beliefs, there seems to be a lessening of interest in the connections between nuclear disarmament and sustained human progress.

The paper explores how the detonation of nuclear weapons would impact on the following headline issues and how they connect to nuclear disarmament: (a) climate change; (b) development; (c) international law; (d) gender; (e) protection of cultural heritage; (f) public health; (g) non-state armed groups; (h) humanitarian action; and (i) cyber security.

The paper concludes that nuclear weapons pose overwhelming dangers to global health, development, the climate, social structures and human rights. The detonation of nuclear weapons – whether accidentally, inadvertently or deliberately – would have disastrous immediate and long-term impacts both in the location of the detonation and also in many others parts of the world. It is time that the international community joined up the issues in a coherent multilateral, high-level approach, in which human security and survival of the species is placed at the centre of international decision-making.

I. Introduction

1. Member states of the UN have made steady and meaningful progress on important and urgent issues in recent years. From international action on climate change to the 2015 agreement on the sustainable development goals (SDGs), resources are being husbanded and the determination to solve them is palpable. And yet there is a blind spot in the united global responsibility discourse; that of nuclear disarmament.

¹ Thanks to the Department of Foreign Affairs and Trade, Ireland for funding the study.



2. The sheer physical impact of nuclear weapons detonations would destroy so much of what has been built. Dwarfing the impact of conventional weapons, the use of nuclear weapons – even in a limited regional war – could instantaneously destroy millions of people, their cities, their culture and their histories. The long-term effects are estimated to have the potential to kill, more slowly and with immense suffering, a further two billion people² through radioactive debris and climate change affecting water, air, crop production, and animal and human life. All that has been built in terms of relationships between countries, international law, human rights, environmental care, and the norms and confidence to build a safer and secure world are currently being placed in jeopardy owing to the international failure to address nuclear disarmament and non-proliferation effectively.

3. Sidelining nuclear disarmament while addressing all the other important issues is a high-risk decision. Leaving nuclear disarmament and non-proliferation obligations unfulfilled could have severe impact on the efforts under way to address environmental issues, SDG implementation, gender equality, public health measures and so on. The legal gaps are also of significance to other interconnected issues, and gaping vulnerabilities have opened up that could further undermine the rule of law and even serve to unravel other parts of the legal infrastructure.

4. It will be twenty years in September 2016 since the Conference on Disarmament (CD) negotiated a treaty.³ Despite significant progress on the nuclear non-proliferation and nuclear security fronts since the 2010 Non-Proliferation Treaty (NPT) Action Plan⁴ was agreed, very little progress has been made on the nuclear disarmament side in the last six years. Hoping that nuclear disarmament and non-proliferation measures will somehow fall into place without sustained attention and diplomatic progress is wishful thinking. Just as all of humanity is interconnected – genetically, geographically, historically and emotionally – so are all of the major global concerns and their legal frameworks. Failure to address nuclear disarmament and non-proliferation with the urgency and energy it deserves puts everything else at risk.

5. This paper explores the proposition that all those who are concerned about the survivability of the planet and the betterment of humanity need to be equally concerned about nuclear weapons and nuclear disarmament. The purpose of the paper is to highlight some of the connections across the divides⁵ and ways in which continuing nuclear weapons possession impacts on a set of issues where the possibility of nuclear weapons use is rarely discussed or factored in to policy-making. The top-table, headline issues include the environment and climate change, SDGs, protection of cultural heritage, international law, gender equality, humanitarian action, public health and cyber security.

² Nuclear Famine: Two Billion People at Risk? Global Impacts of Limited Nuclear War on Agriculture, Food Supplies, and Human Nutrition, Ira Hefland, <http://www.ipnw.org/pdf/nuclear-famine-two-billion-at-risk-2013.pdf>

³ The Comprehensive Nuclear-Test-Ban Treaty (CTBT), <http://ctbto.org/the-treaty/>

⁴ See for example: NPT Action Plan monitoring reports, Reaching Critical Will, <http://www.reachingcriticalwill.org/resources/publications-and-research/publications/5456-npt-action-plan-monitoring-reports>; 2015 Monitoring Report: Implementation of the 2010 NPT Action Plan, Disarmament Actions 1-22, Center for Nonproliferation Studies, Middlebury Institute of International Studies, <http://www.nonproliferation.org/2015-npt-monitoring-report-disarmament/>; and Nuclear Weapons: The State of Play 2015, Gareth Evans, Tanya Ogilvie-White and Ramesh Thakur, Centre for Nuclear Non-Proliferation and Disarmament, Crawford School of Public Policy, ANU College of Asia & the Pacific, <https://cnnd.crawford.anu.edu.au/publication/cnnd/5328/nuclear-weapons-state-play-2015>

⁵ For an excellent paper on these connections see Unspeakable Suffering: the humanitarian impact of nuclear weapons, ed. Beatrice Fihn, Reaching Critical Will, <http://www.reachingcriticalwill.org/resources/publications-and-research/publications/7422-unspeakable-suffering-the-humanitarian-impact-of-nuclear-weapons>

6. The far-reaching international commitments that countries have made on those urgent global issues are inextricably linked to the international commitments on nuclear weapons. Leaving nuclear disarmament and non-proliferation obligations unfulfilled could have severe impacts on all the efforts under way to address climate change, SDG implementation, international law, gender equality, humanitarian action, public health measures and cultural heritage protection. Nuclear weapons and the legal framework pertaining to them are fundamentally connected to the full range of top-tier concerns and form the missing link in multilateralism.

II. Risks

7. Risk is calculated by multiplying the range of potential consequences by the range of predicted probabilities. In all fields of risk calculation, the understanding of risk is constantly changing and needs continual reassessment. This is also true for the risks associated with nuclear weapons, which change over time on the basis of new understanding, particularly of the consequences and likelihood of potential use, whether by accident or intent.

8. Nuclear weapons differ from other types of explosive weapons in four respects: the size and scale of the explosion; the total amount of energy released as blast, light and heat; the release of radioactive energy and materials; and long-term climate change impacts.

9. Most of the damage caused by a nuclear weapon detonation is due to the shock wave and subsequent high-velocity winds. In most nuclear explosions, 40-50% of the energy is in the blast effects of the shock wave and winds. The second largest effect is in the intense heat and fires caused by thermal radiation, which carries approximately 35-45% of the total energy of the weapon. The rest of the energy (5-15%) lies in the ionizing radiation that is released immediately in the form of gamma rays, neutrons, small nuclei and electrons. Radioactive debris in the form of heavier isotopes such as radioactive iodine, cesium and strontium will spread into the atmosphere depending on wind and weather conditions, falling later as radioactive fallout. In addition, if 100 or more medium-sized nuclear weapons were exploded in highly populated cities, the resulting global spread of carbon could produce severe climatic and environmental effects. These would include ozone depletion, radioactive contamination, severe frosts and global famine for decades.

10. The explosive power of nuclear weapons is measured in equivalent tonnes of TNT. A 15 kt weapon is designed to produce a yield equivalent to 15,000,000 kg of TNT. Conventional bombs are between one-millionth and one-thousandth less in explosive power. The effects of a nuclear explosion depend on the yield, design, whether it occurs in the air or at the ground, surrounding weather conditions, the topography of the landscape and the number of inhabitants living in the target vicinity.

11. Over the last seventy years, new information has allowed better understanding of the consequences of nuclear weapons use. Long-term health effects on the survivors of attacks on Hiroshima and Nagasaki in 1945 – the Hibakusha – and continued studies on the effects of nuclear weapons testing programmes on the health of Downwinders, including in the United States, the South Pacific islands, Kazakhstan and Australia, reveal increased vulnerability to primary and secondary cancers, and significantly differentiated impacts on population groups according to gender and age. Changing population patterns such as urbanization, with significantly more people now living in large cities, have meant that

there are new realities and limits for the humanitarian and medical responses to a nuclear weapons attack.⁶

12. The understanding of the probabilities of use have changed since the end of the Cold War, partly because new information has been revealed about how close humanity has come to nuclear weapons use owing to accidents and miscalculations throughout the Cold War.⁷ In addition, there are now more nuclear weapons possessors than there were during the Cold War, some in regions of high tension and conflict. As the risks of large-scale regional and global conflict change, the probability that nuclear weapons will be used in war is also changing. Traditional ideas associated with Cold War nuclear stability – whether credible or not – therefore cannot be simply imported into this new era.

13. Although most experts and governments working to reduce and eliminate nuclear weapons are cognizant of the changing risk picture, other expert communities are unaware of the dangers that nuclear weapons still pose. Experts and officials who work, for example, on development and environmental issues are for the most part unengaged with nuclear disarmament and non-proliferation efforts, perhaps believing the connections are tenuous or that nuclear weapons issues are being successfully addressed and no longer require attention.

III. Interconnected issues

A. Nuclear Weapons and Climate Change

14. Climate change has potentially overwhelming consequences for the future of the planet and the life it sustains. Likewise, nuclear weapons have the potential to wreck the climate and trigger global famine.

15. Along with nuclear weapons and virulent diseases, climate change is one of the most significant global strategic threats to humanity. It will increase global stresses such as severe weather events, food production security, fresh water scarcity and migration. The most recent synthesis report from the Intergovernmental Panel on Climate Change (IPCC)⁸ outlines the effects of climate change on water availability, food production, and economic development, which are likely to increase the instability of populations, displacement and migration, and to amplify drivers of violent conflict. It predicts that violent conflict would increase the set of vulnerabilities to climate change. Other research demonstrates that violent conflict increases the impacts of climate stress on vulnerable populations⁹ and that climate change itself could cause instabilities and undermine already fragile governments,¹⁰ thus escalating conflict; in some circumstances this could lead to a nuclear conflict.

⁶ An Illusion of Safety: Challenges of Nuclear Weapon Detonations for United Nations Humanitarian Coordination and Response, John Borrie and Tim Caughley, UNIDIR 2014, <http://www.unidir.org/illusionofsafety>

⁷ Command and Control: Nuclear Weapons, the Damascus Accident, and the Illusion of Safety, Eric Schlosser, Penguin Books 2014; Too Close for Comfort: Cases of Near Nuclear Use and Options for Policy, Patricia Lewis, Heather Williams, Benoît Pelopidas and Sasan Aghlani, Chatham House Report 2014, <https://www.chathamhouse.org/publications/papers/view/199200>

⁸ Intergovernmental Panel on Climate Change (IPCC). 'Climate Change 2014 Synthesis Report,' 2014, https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf

⁹ Kloos, J., Gebert, N., Rosenfeld, T., and Renaud, F., 'Climate Change, Water Conflicts And Human Security: Regional Assessment and Policy Guidelines for the Mediterranean, Middle East And Sahel,' *UNU-EHS Institute for Environment and Human Security*, No. 10, August 2013.

¹⁰ CNA Military Advisory Board, 'National Security and the Accelerating Risks of Climate Change, 2014 http://www.cna.org/sites/default/files/MAB_2014.pdf

16. Enormous efforts have been made by governments, industries, experts and activists to address and reduce the likely escalation of climate change. The 2015 Paris Agreement,¹¹ in which 196 states adopted a universal, legally binding global treaty aimed at limiting average global warming to less than 2°C above pre-industrial levels, demonstrates how major global threats can stimulate urgent and concerted action, even during difficult political times. If nuclear weapons were to be used again in a conflict, then all of the work and achievements of the climate change negotiators would be rendered useless; the climate would change for other reasons and in a completely different direction.

17. In a ground-breaking study, a climate science group¹² examined the global impacts of a regional nuclear war. The study employed atmospheric chemistry, ocean dynamics, and interactive sea ice and land components in the system modelling. The scenario of a limited, regional nuclear war in Asia was modelled in which 100 Hiroshima-size (15 kt) nuclear weapons were detonated. The calculations showed that this scenario could produce approximately 5 teragrammes (or 5 million tonnes) of black carbon. The carbon would spread globally through the stratosphere, producing a sudden drop in surface temperatures and intense heating of the stratosphere.

18. The climatic and environmental effects would include unprecedented ozone losses of 20-50 per cent over populated areas, and increases in UV indices of 30-80 per cent over mid-latitudes in the summer months that would damage human and animal health, agriculture, and terrestrial and aquatic ecosystems. In addition, severe frosts would reduce growing seasons by an estimated 10-40 days per year over five years. Over a 25-year period, surface temperatures would decline, with continuing reductions in food production resulting in global famine and subsequent massive loss of life. More recent work has uncovered a wider range of catastrophic effects such as the long-term impacts on agricultural production in China¹³ and the United States.¹⁴

19. The new evidence on the long-term climate effects of nuclear weapons has led to calls to address the applicability of environmental law to the development, possession and use of nuclear weapons. In a recent comprehensive study on nuclear weapons under international law, experts propose three legal perspectives for the protection of the environment from nuclear weapons: (i) apply environmental norms within international humanitarian law; (ii) examine the application of multilateral environmental treaties within a conflict and (iii) consider nuclear weapons as complex regulatory objects that pollute the environment on production, deployment and detonation.¹⁵ Connecting the expert and diplomatic communities that work on nuclear weapons and climate change could yield new perspectives and understanding, with the potential for generating practical ideas on ways to move forward.

¹¹ The Paris Agreement, https://treaties.un.org/doc/Treaties/2016/02/20160215%2006-03%20PM/Ch_XXVII-7-d.pdf

see also the 22 April 2016 UN signing ceremony:

<http://www.un.org/apps/news/story.asp?NewsID=53756#.Vxs4QWOhjzI>

¹² Michael J. Mills, Owen B. Toon, Julia Lee-Taylor, and Alan Robock, Multidecadal global cooling and unprecedented ozone loss following a regional nuclear conflict, 2008, <http://climate.envsci.rutgers.edu/pdf/MillsNWeft224.pdf>

¹³ Lili Xia, Alan Robock, Michael Mills, Andrea Stenke, and Ira Helfand, Decadal reduction of Chinese agriculture after a regional nuclear war, *Earth's Future*, 3 37–48, 6 February 2015, <http://climate.envsci.rutgers.edu/pdf/XiaChinaAgro.pdf>

¹⁴ Özdoğan, Mutlu, Alan Robock, and Christopher Kucharik, 2013: Impacts of a nuclear war in South Asia on soybean and maize production in the Midwest United States. *Climatic Change*, 116, 373-387, <http://climate.envsci.rutgers.edu/pdf/OzdoganNuclearWinterMidwestPrint.pdf>

¹⁵ Martina Kunz and Jorge E. Vinuales, *Environmental Approaches to Nuclear Weapons in Gro Nystuen, Stuart Casey-Maslen and Annie Golden Bersagel (eds.), Nuclear Weapons under International Law*, Cambridge University Press, 2014, pp 269-291

B. Nuclear Weapons and Development

20. Not least of the most important international developments in recent years has been the success of the 2000-15 Millennium Development Goals (MDGs¹⁶) and the subsequent establishment of the Sustainable Development Goals. The 2015 agreement to move forward with the ambitious 2030 Agenda for Sustainable Development, and the 17 SDGs and 169 targets¹⁷ are a testament to the determination of the United Nations, its member states and the NGOs that collectively implement the development goals.

21. The 2015 SDGs make a specific connection between peace and development and include: (a) ending poverty in all its forms everywhere; (b) ending hunger, achieving food security and improved nutrition and promoting sustainable agriculture; (c) ensuring healthy lives and promoting wellbeing for all at all ages; (d) ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all; (e) achieving gender equality and empowering all women and girls; (f) ensuring availability and sustainable management of water and sanitation for all; (g) ensuring access to affordable, reliable, sustainable and modern energy for all; (h) promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; (i) building resilient infrastructure, promoting inclusive and sustainable industrialization and fostering innovation; (j) reducing inequality within and among countries; (k) making cities and human settlements inclusive, safe, resilient and sustainable; (l) ensuring sustainable consumption and production patterns; (m) taking urgent action to combat climate change and its impacts; (n) conserving and sustainably using the oceans, seas and marine resources for sustainable development; (o) protecting, restoring and promoting sustainable use of terrestrial ecosystems, sustainably managing forests, combating desertification, and halting and reversing land degradation and halting biodiversity loss; (p) promoting peaceful and inclusive societies for sustainable development, providing access to justice for all and building effective, accountable and inclusive institutions at all levels; (q) strengthening the means of implementation and revitalizing the Global Partnership for Sustainable Development.

22. In Article 26 of the Charter of the United Nations, Member States undertake to promote 'the establishment and maintenance of international peace and security with the least diversion for armament of the world's human and economic resources'. In 1987, an international conference was held on the relationship between disarmament and development. It focused particularly on the scale and impact of military expenditure on the world economy and on development, and on steps to set free the resources that were – and remain – needed for development through disarmament.

23. Over many years, hard evidence from studies on human development has led to the understanding that development flows from security and stability, provided for by good governance.¹⁸ In the 1990s, the resurgence of several frozen conflicts demonstrated that investment in development – and the progress made as a result – would all be in vain. If there were no resources invested in conflict prevention and disarmament. All the hard-won progress, efforts and resources dedicated to education, human rights and poverty

¹⁶ The measured achievements of the 15 years of action since the establishment of the MDGs were substantial, including: reducing the number of people living in extreme poverty and under-five mortality rate by over 50%; diminishing the proportion of undernourished people in developing areas and maternal mortality worldwide by nearly 50%.

¹⁷ Transforming our world: the 2030 Agenda for Sustainable Development <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>

¹⁸ See also the 1987 International Conference on Disarmament and Development and UN General Assembly resolution 57/65, 22 November 2002, <http://www.unidir.org/files/medias/pdfs/general-assembly-resolution-eng-0-118.pdf>

eradication are all undermined once weapons begin to flow back into a country with unresolved conflicts. Indeed, it could be even worse than sliding back to zero; the exhaustion and despondency that result from the return to the cycle of violence could potentially set efforts back by generations.

24. The links between disarmament, conflict prevention and development may be complex but they are clear. Much has been built on the understanding of the strong connections between disarmament and development.¹⁹ The connections between nuclear disarmament and development have not been as fully accepted as those for conventional or chemical and biological weapons. However, the detonation of nuclear weapons in regional or global conflicts would have the potential for devastation far beyond the impact of any conventional war²⁰. With the exception of a possible improvised nuclear device in a terrorist attack, the detonation of one or more nuclear weapons would most likely be in the context of an inter-state conflict that would initially be fought with conventional weaponry. The continuum from conventional to nuclear weapons can be understood through the perspective of their humanitarian impact.²¹ Indeed, the link between conventional weapons control and nuclear disarmament has been stressed repeatedly by the possessors of nuclear weapons.²² This link is also significant for developing countries, not least with regard to their knowledge and expertise, and their participation in nuclear disarmament forums.²³

25. Military expenditure and the related diversion of funds away from development create a paradox, especially given the high priority that has to be accorded to development after a conflict.²⁴ Large numbers of reserved armed forces and expanded medical corps would be needed in the event of a single nuclear detonation targeting troops. Moreover, the

¹⁹ The 1997 Mine Ban Treaty states that anti-personnel mines ‘obstruct economic development and reconstruction, inhibit the repatriation of refugees and internally displaced persons, and have other severe consequences for years after emplacement’¹⁹. The 2001 UN Programme of Action on the Illicit Trade in Small Arms and Light Weapons¹⁹ refers to the serious threat that SALWs pose to ‘peace, reconciliation, safety, security, stability and sustainable development’ and the 2008 Convention on Cluster Munitions¹⁹ states that ‘cluster munition remnants kill or maim civilians, including women and children, obstruct economic and social development, including through the loss of livelihood’. Ever further, the Arms Trade Treaty acknowledges ‘that peace and security, development and human rights are pillars of the United Nations system and foundations for collective security’ and recognizes that ‘development, peace and security and human rights are interlinked and mutually reinforcing’. All these treaties are put into practice through concrete set of measures to sustain development, such as demining and mine clearance activities, clearance of cluster munitions from areas, protection of civilians by marking and putting signs on areas with cluster munitions.

²⁰ Sara Sekkenes, Challenges in addressing the long-term effects of nuclear explosions, Conflict Prevention and Recovery Adviser UNDP, presentation to the Second Conference on the Humanitarian Impact of Nuclear Weapons, Nayarit, Mexico 2014

²¹ the connections between conventional and nuclear weapons impacts is well expressed in Weapons: ICRC statement to the United Nations, 15 October 2015, <https://www.icrc.org/en/document/weapons-icrc-statement-united-nations-2015>

²² For example, recent statements on nuclear disarmament in the context of general and complete disarmament such as: Statement by Jean-Hugues Simon-Michel, France, 2015 NPT Review Conference 1 May 2015, http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/npt/revcon2015/statements/1May_France.pdf and by Ambassador Mikhail I.Uliyanov, Russian Federation, 2015 NPT Review Conference 1 May 2015, http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/npt/revcon2015/statements/1May_Russia.pdf.

²³ Disarmament, development and patterns of marginalisation in international forums, Article 36, April 2016, <http://www.article36.org/wp-content/uploads/2016/04/A36-Disarm-Dev-Marginalisation.pdf>

²⁴ Reaching Critical Will Disarmament and Development, Fact Sheet: <http://www.reachingcriticalwill.org/resources/fact-sheets/critical-issues/4646-disarmament-and-development>

costs of such weapons are not limited to their production and storage but are also in the delivery and targeting systems, and in maintenance of their command- and-control systems.²⁵ In a seminal study, Susan Willet²⁶ examined the basis for the costs of armaments relative to the costs of disarmament, investigating whether expenditure on nuclear disarmament increases security more cost-effectively than the equivalent expenditure on military force. The study concluded that nuclear arms competitions exact high socio-economic costs including high environmental costs. In diverting resources away from poverty alleviation, nuclear weapons possessors could be inadvertently increasing the levels of internal insecurity and conflict.

26. The impact of the detonation of nuclear weapons is not simply an issue for the states that possess them. Even countries without nuclear weapons and located far from regions that may be potential nuclear battlefields will suffer the consequences of nuclear detonations such as radioactive debris and climate disruption. Throughout the era of atmospheric nuclear weapons tests, atmospheric mixing from the northern to the southern hemisphere spread radioactive isotopes that affected water sources and food crops and the health of humans and animals. Countries that host large-scale sporting or cultural events such as the World Cup or the Olympics have to consider the full range of possibilities for terrorist attacks. In preparing for the 2010 World Cup, South Africa's first-responders developed response plans for a wide range of terrorist attacks, including WMD scenarios.²⁷ No country can consider itself exempt from the potential consequences of nuclear weapons detonations and the impact on human development.

C. Nuclear Weapons and International Law

27. Nuclear disarmament has been at the heart of international law since the very first UN General Assembly resolution called for the elimination of atomic weapons.²⁸ The risks of nuclear weapons run contrary to the framework of human rights^{29,30} and the right to freedom from fear outlined in the United Nations Millennium Declaration.³¹ In 1984, the United Nations Human Rights Committee addressed the issue of nuclear weapons, stating that

the designing, testing, manufacture, possession and deployment of nuclear weapons are among the greatest threats to the right to life which confront mankind today. This threat is compounded by the danger that the actual use of such weapons may be brought about, not only in the event of war, but even through human or mechanical error or failure. Furthermore, the very existence and gravity of this threat generates a climate of suspicion and fear between States, which is in itself antagonistic to the promotion of universal respect for and observance of human rights and fundamental

²⁵ Stephen Schwartz (ed.), *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940*, Brookings Arms Control Initiative,

<http://www.brookings.edu/about/projects/archive/nucweapons/weapons>

²⁶ Susan Willett, *The Costs of Disarmament*, UNIDIR, <http://www.unidir.org/programmes/security-and-society/the-costs-of-disarmament>

²⁷ Col Mark Pillay, *2010 Fifa World Cup Response Capabilities*, Third Conference on the Humanitarian Impact of Nuclear Weapons, Vienna 2014, https://www.bmeia.gv.at/fileadmin/user_upload/Zentrale/Aussenpolitik/Abriegelung/HINW14/Presentations/HINW14_S3_Presentation_Mark_Pillay.pdf

²⁸ Establishment of a Commission to Deal with the Problems Raised by the Discovery of Atomic Energy A/RES/1(I) 24 Jan. 1946, [http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/1\(I\)&referer=http://www.un.org/depts/dhl/resguide/r1_resolutions_table_eng.htm&Lang=E](http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/1(I)&referer=http://www.un.org/depts/dhl/resguide/r1_resolutions_table_eng.htm&Lang=E)

²⁹ <http://www.un.org/en/universal-declaration-human-rights/>

³⁰ <http://www.ohchr.org/en/professionalinterest/pages/ccpr.aspx>

³¹ http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/55/2

freedoms in accordance with the Charter of the United Nations and the International Covenants on Human Rights. The production, testing, possession, deployment and use of nuclear weapons should be prohibited and recognized as crimes against humanity.³²

28. In reaffirming that promoting respect for human rights is a core purpose of the UN, and recognizing the ‘systemic failure’ in meeting UN responsibilities, the Human Rights up Front initiative³³ was established to ensure that the UN system takes early and effective action to prevent or respond to large-scale violations of human rights or international humanitarian law. The initiative promotes system-wide analysis, early warning and action in response to situations of concern and to address complex risks, protect human rights and prevent conflict. In particular, it is aimed at ‘the urgent need to react early and to take effective action before situations get out of control, leading to immense human suffering’.³⁴ Human Rights up Front address six main areas of action that ‘place the protection of human rights and of people at the heart of UN strategies and operational activities’. These include: (a) fully integrating human rights throughout the work of the United Nations; (b) providing member states with candid information with respect to peoples at risk of, or subject to, serious violations of human rights or humanitarian law; (c) ensuring coherent strategies and responses; (d) clarifying and streamlining procedures, enhancing communication and facilitating early, coordinated action; (e) strengthening the United Nations’ human rights capacity; and (f) developing a common United Nations information management system on serious violations of human rights and humanitarian law.

29. The United Nations was established to ‘save succeeding generations from the scourge of war’. Children are particularly vulnerable to radiation damage. Research at the US National Cancer Institute has found that they were at a higher risk of physical damage to exposure to radiation than adults during the period of fallout from atmospheric nuclear weapons testing. Children may be subject to higher doses than adults because of higher intake and accumulation, for example through exposure to iodine-131 in irradiated fresh milk.³⁵ In addition, radiation damage susceptibility is highest in early childhood (and even more *in utero*), most likely primarily because of the fast rate of cell division in developing tissues. The length of exposure over a lifetime also results in increased chances of repeated exposure and accumulated damage, which will lead to a higher cancer risk for children.³⁶ Nuclear weapons use inevitably places children directly in danger, and affects their lives well after a detonation. Such a situation jeopardizes the rights of the child and all the work carried out on establishing those rights.³⁷ Through the Convention on the Rights of the Child,³⁸ states parties undertake to respect and to ensure respect for rules of international humanitarian law applicable to them in armed conflicts which are relevant to the child, and

³² Nuclear Weapons and the Right to Life, ICCPR General Comment No. 14: Article 6 (Right to Life) Adopted at the Twenty-third Session of the Human Rights Committee, on 9 November 1984, <http://www.refworld.org/docid/453883f911.html>

³³ <http://www.un.org/sg/humanrightsupfront/>

³⁴ United Nations Deputy Secretary-General Jan Eliasson, 26 January 2016, <http://www.un.org/apps/news/story.asp?NewsID=53115#.VxjtPmOhzJ>

³⁵ Comprehensive Test Ban Treaty Organization, The United States’ Nuclear Testing Programme, <https://www.ctbto.org/nuclear-testing/the-effects-of-nuclear-testing/the-united-states-nuclear-testing-programme/>

³⁶ Children and Radiation, Children's Health and the Environment, World Health Organization, WHO Training Package for the Health Sector, <http://www.who.int/ceh/capacity/radiation.pdf>

³⁷ UNICEF, Fact Sheet, A Summary of the Rights under the Convention of the Rights of the Child.

³⁸ Article 38 (1), Convention on the Rights of the Child <http://www.ohchr.org/Documents/ProfessionalInterest/crc.pdf>

to take all feasible measures to ensure protection and care of children who are affected by an armed conflict.³⁹

30. In 1996, the fourteen judges of the International Court of Justice (ICJ), in their Advisory Opinion about the Legality of the Threat or Use of Nuclear Weapons, concluded unanimously that the principles and rules of international humanitarian law apply to the use of nuclear weapons. They added that the use of nuclear weapons would generally be contrary to the principles and rules of international humanitarian law.⁴⁰ In response, the International Committee of the Red Cross (ICRC) made a statement to the 51st session of the United Nations General Assembly welcoming the Court's emphasis that humanitarian law applies to all weapons without exception.⁴¹ The ICRC drew particular attention to the destructive power of nuclear weapons, which

“cannot be contained in either space or time ... the radiation released by a nuclear explosion would affect health, agriculture, natural resources and demography over a very wide area. Further, the use of nuclear weapons would be a serious danger to future generations ... In the light of this, the ICRC finds it difficult to envisage how a use of nuclear weapons could be compatible with the rules of international humanitarian law”⁴².

31. Humanitarian disasters have frequently served as the impetus for the prohibition of weapons and related activities. The 1925 Geneva Protocol and the subsequent banning of chemical and biological weapons under the Chemical Weapons and Biological Weapons Conventions respectively were a direct consequence of the devastating humanitarian impact of use of poison gas in the First World War.⁴³ The 1963 Partial Test Ban Treaty and the subsequent 1996 CTBT were the result of the global demand to end the devastating humanitarian impacts of nuclear weapons tests on people's health, to prevent social and environmental and human rights effects, and to end the nuclear arms race with its potential humanitarian consequences. Under International Humanitarian Law (IHL), combatants are prohibited to use weapons that are inherently indiscriminate or that are of a nature to inflict suffering greater than that required to take combatants 'out of action'. Weapons which violate the 'dictates of the public conscience' may be prohibited on that basis alone. The use of weapons that cause widespread, long-term and severe damage to the natural environment is likewise prohibited.⁴⁴

32. As the president of the ICRC stated in 2015: 'nuclear weapons are often presented as promoting security, particularly during times of international instability, but weapons that

³⁹ The Convention on the Rights of the Child makes a special reference to the Declaration on the Protection of Women and Children in Emergency and Armed Conflict, which in turn prohibits and condemns attacks and bombings on the civilian population, inflicting incalculable suffering, especially on women and children. Declaration on the Protection of Women and Children in Emergency and Armed Conflict, <http://www2.ohchr.org/english/law/pdf/protectionwomen.pdf>

⁴⁰ International Court of Justice CJ, Reports of Judgments, Advisory Opinions and Orders Legality of the Threat or Use of Nuclear Weapons
Advisory Opinion of 8 July 1996, Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1.C.J. Reports 1996, p. 226 <http://www.icj-cij.org/docket/index.php?p1=3&p2=4&k=e1&case=95&code=unan&p3=4>

⁴¹ ICRC statement to the 51st United Nations General Assembly on the Advisory Opinion of the International Court of Justice on the legality of the threat or use of nuclear weapons, 1996, <http://www.icrc.org/web/eng/siteeng0.nsf/html/57JNFU>.

⁴² *ibid*

⁴³ Patricia M. Lewis, A New Approach to Nuclear Disarmament: Learning from International Humanitarian Law Success ICNND Research Report No. 13, 2009

⁴⁴ Weapons and International Humanitarian Law, ICRC, http://www.icrc.org/Web/Eng/siteeng0.nsf/htmlall/section_ihl_weapons?OpenDocument

risk catastrophic and irreversible humanitarian consequences cannot seriously be viewed as protecting civilians or humanity as a whole'.⁴⁵

33. At the 2010 NPT Review Conference the 'catastrophic humanitarian consequences that would result from the use of nuclear weapons' was important in developing the conceptual legal framework for nuclear disarmament.⁴⁶ The Humanitarian Impact of Nuclear Weapons initiative has held thus far three conferences: in Oslo in March 2013,⁴⁷ Nayarit in February 2014⁴⁸ and Vienna in December 2014.⁴⁹ The conferences have produced a wealth of fact-based materials and legal analyses and a number of political documents including the Humanitarian Pledge⁵⁰ by states to follow the imperative of human security for all and to promote the protection of civilians against risks stemming from nuclear weapons; and to cooperate with all relevant stakeholders in efforts to stigmatize, prohibit and eliminate nuclear weapons in the light of their unacceptable humanitarian consequences and associated risks. The pledge calls on all states parties to the NPT to renew their commitment to the urgent and full implementation of existing obligations under Article VI and 'identify and pursue effective measures to fill the legal gap for the prohibition and elimination of nuclear weapons' and 'cooperate with all stakeholders to achieve this goal'; it also calls on all nuclear weapons possessor states to 'take concrete interim measures to reduce the risk of nuclear weapon detonations'. The Humanitarian Pledge was adopted as UN General Assembly Resolution 70/48 in 2015 with a vote of 139 in favour, 29 against and 17 abstentions.⁵¹

34. The Humanitarian Pledge call for states to 'identify and pursue effective measures to fill the legal gap for the prohibition and elimination of nuclear weapons' refers primarily to the fact that although treaties to prohibit and eliminate chemical and biological weapons are in force, no such global regime has yet been negotiated for nuclear weapons. There is dispute as to whether the use of nuclear weapons is already prohibited under international law.⁵² Although the ICJ was unanimous in the applicability of IHL to nuclear weapons, the Court did not exclude the legality of the use of a nuclear weapon in 'extreme circumstances of self defence'. It advised that the possession of nuclear weapons would constitute an unlawful threat only if the particular use of force envisaged would be directed against the territorial integrity or political independence of a state, or would be inconsistent with the purposes of the United Nations, or would violate the principles of necessity and

⁴⁵ Peter Maurer, President of the ICRC, Nuclear weapons: Ending a threat to humanity, 18 February 2015 <https://www.icrc.org/en/document/nuclear-weapons-ending-threat-humanity>

⁴⁶ 2010 NPT Review Conference Final Document, www.reachingcriticalwill.org/images/documents/Disarmament-fora/npt/revcon2010/FinalDocument.pdf.

⁴⁷ The Oslo Conference on the Humanitarian Impact of Nuclear Weapons, 4-5 March 2013, https://www.regjeringen.no/en/topics/foreign-affairs/humanitarian-efforts/humimpact_2013/id708603/

⁴⁸ The Nayarit Conference on the Humanitarian Impact of Nuclear Weapons, 13-14 February 2014, <http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/nayarit-2014/chairs-summary.pdf>

⁴⁹ The Vienna Conference on the Humanitarian Impact of Nuclear Weapons, 8-9 December 2014, <https://www.bmeia.gv.at/en/european-foreign-policy/disarmament/weapons-of-mass-destruction/nuclear-weapons-and-nuclear-terrorism/vienna-conference-on-the-humanitarian-impact-of-nuclear-weapons/>

⁵⁰ The Humanitarian Pledge, http://www.icanw.org/wp-content/uploads/2015/03/HINW14vienna_Pledge_Document.pdf

⁵¹ Humanitarian Pledge for the Prohibition and Elimination of Nuclear Weapons UNGA Res 70/48, 2015, <http://www.icanw.org/wp-content/uploads/2015/03/Pledge-Vote-2015.pdf>

⁵² Gro Nystuen and Kjølsv Egeland, A 'Legal Gap'? Nuclear Weapons Under International Law Arms Control Today, March 2016, http://www.armscontrol.org/ACT/2016_03/Features/A-Legal-Gap-Nuclear-Weapons-Under-International-Law#note6

proportionality.⁵³ **Given the 20-year-long legal and political dispute, and the unacceptable humanitarian consequences of the use of nuclear weapons, the gap in treaty law to control and eliminate nuclear weapons needs to be addressed.** In a recent comprehensive legal analysis, an international group of legal experts concluded ‘that a multiplicity of international legal regimes governs different aspects of nuclear weapons, and that use of nuclear weapons in most instances would be outlawed. But a clear-cut and comprehensive prohibition of nuclear weapons is still missing.’⁵⁴

D. Nuclear Weapons and Gender

35. Not only are women vital to disarmament negotiations – in representing half the world’s population – but they also present distinct concerns for nuclear disarmament. Recent studies on the gendered impact of nuclear weapons highlight that girls exposed to harmful radiation are twice as likely as boys to get cancer at some point in their lives, and that lifetime cancer fatalities among exposed adults are disproportionately more harmful to women than to men, in the ratio of 3:2.⁵⁵ This disproportionate impact on girls and women has knock-on effects on subsequent generations. As stated in a recent study, ‘Women and girls are not a sub-population. Women and girls are an inextricable link in the human lifecycle.’⁵⁶

36. The 2015 SDGs include achieving gender equality and empowering all women and girls. Since 2000 and the adoption of Resolution 1325, the UN Security Council has adopted seven resolutions on Women Peace and Security.⁵⁷ Resolution 1325 specifically addresses the role and importance of women in peace processes and ‘makes the pursuit of gender equality relevant to every single Security Council action, ranging from elections to disarmament efforts’. The resolution calls for women’s equal participation and full involvement in all efforts for the maintenance and promotion of peace and security, and for the incorporation of gender perspective in all areas of peace-building. Resolution 1820 addresses the impact of sexual violence in conflict and acknowledges sexual violence as a weapon of war and a war crime and mandates UN peacekeeping missions to protect women and children from sexual violence during armed conflict, with the Office of the Special Representative of the Secretary-General on Sexual Violence in Conflict.

37. The 2013 UN Resolution on Women, Disarmament, Non-Proliferation and Arms Control adopted by the General Assembly called for all member states to include women in national and international discussions and to ensure equal representation in decision-making processes.⁵⁸ **Because women are biologically more vulnerable than men to the harmful effects of radiation,⁵⁹ they have distinct issues to raise in negotiations – issues that may not otherwise be placed on the negotiating table.**

⁵³ Pieter H.F. Bekker, Advisory Opinions of the World Court on the Legality of Nuclear Weapons, Insights, The American Society of International Law, Vol 1, Issue 5, 11 November, 1996, <https://www.asil.org/insights/volume/1/issue/5/advisory-opinions-world-court-legality-nuclear-weapons>

⁵⁴ Gro Nystuen, Stuart Casey-Maslen and Annie Golden Bersagel (eds), Nuclear Weapons Under International Law, Cambridge University Press, 2014

⁵⁵ K. Ozasa et al, ‘Studies of the mortality of atomic bomb survivors: Report 14, 1950-2003—an overview of cancer and non-cancer diseases’, Radiation Research, vol. 177, no. 3, 2012, p.232.

⁵⁶ Mary Olson, Gender Matters in the Atomic Age, United Nations, 5 May, 2015, <http://www.nirs.org/radiation/radhealth/untalk2015.pdf>

⁵⁷ <http://www.un.org/en/peacekeeping/issues/women/wps.shtml>

⁵⁸ United Nations General Assembly, Resolution adopted by the General Assembly on December 2013: Women, Disarmament, Non-Proliferation and Arms Control, A/RES/68/33, 9 December 2013.

⁵⁹ Anne Guro Dimmen, Gendered Impacts: The humanitarian impacts of nuclear weapons from a gender perspective, ILPI-UNIDIR Vienna Conference Series, Paper No:5

E. Nuclear Weapons and Protection of Cultural Heritage

38. Over several decades fears about the wilful, deliberate destruction of cultural heritage in times of conflict have been growing. Recent events in countries such as Afghanistan (the destruction of the Buddhas of Bamiyan), Mali and Syria (most notably Palmyra) have highlighted the irrevocable damage that is done to cultural property at times of conflict. Cultural heritage – including property, but also ‘intangible heritage’ such as customs, practices and places – are also lost to conflict through forced migration, environmental damage and post-conflict reconstruction.

39. So enormous is the impact of nuclear weapons explosions that they are themselves viewed as a unique marker of destruction, ‘tangible testimony of the birth of the Cold War and ... testimony to the race to develop increasingly powerful nuclear weapons’.⁶⁰ In Bikini Atoll, testing altered the environment to such a degree that it is now itself considered a UNESCO World Heritage Site: ‘It ... bears witness to the consequences of the nuclear tests on the civil populations of Bikini and the Marshall Islands, in terms of population displacement and public-health issues.’⁶¹ Nuclear weapons testing can itself have devastating consequences for cultural heritage, including that which is under the sea. Decades of underwater testing – now outlawed by the CTBT, but still to come into force – have put ruins, shipwrecks and submerged caves at risk.

40. The 1954 Convention for the Protection of Cultural Property in the Event of Armed Conflict⁶² was adopted in response to the massive destruction and theft of cultural heritage during the Second World War. The Convention protects immovable and movable cultural heritage, including architectural monuments, archaeological sites, works of art, manuscripts, books and other objects of artistic, historical or archaeological interest, as well as scientific collections of all kinds regardless of their origin or ownership. The convention incorporates peacetime safeguarding measures such as the preparation of inventories, the planning of emergency protection measures for protection, and the designation of competent authorities responsible for the safeguarding of cultural property. The Convention requires states parties to refrain from any act of hostility directed against such property; consider marking important buildings and monuments with a distinctive emblem; and establish special units within the military forces to be responsible for the protection of cultural property.⁶³

41. Cultural heritage is the common denominator that holds a people and its sense of identity together. In addition to the large number of human casualties, the detonation of even a single nuclear weapon has the potential to devastate a society, erase shared memories, cultural heritage and history. Many of today’s conflicts are in regions such as the Middle East, South Asia and East Asia that also possess some of the world’s most important archaeological sites, unearthed artefacts and registered UNESCO World Heritage Sites. A single detonation in a country within these regions could erase centuries or even millennia of human civilization. Given the potential impact on cultural heritage and the loss to human history, consideration of the impact of nuclear weapons on important cultural artefacts and ways of preventing such catastrophic damage should be part of the requirement for cultural heritage protection in every country and the subject of informed public debate.

⁶⁰ <http://whc.unesco.org/en/list/1339>

⁶¹ *ibid*

⁶² The Convention for the Protection of Cultural Property in the Event of Armed Conflict <http://www.unesco.org/new/en/culture/themes/armed-conflict-and-heritage/the-hague-convention/text-of-the-convention-and-its-1st-protocol/#c284179>

⁶³ <http://www.unesco.org/new/en/culture/themes/armed-conflict-and-heritage/the-hague-convention/#c167451>

F. Nuclear Weapons and Public Health

42. The recent outbreaks of Ebola⁶⁴ and Zika⁶⁵ diseases highlight the enormous complexities associated with responding to sudden public health crises in a globalized world.

43. The catastrophic effects of a nuclear explosion would overwhelm public health systems – even those in developed countries.⁶⁶ In addition to the large number of immediate casualties from a nuclear blast, government authorities and health services would be expected to address other indirect consequences of the explosion, including acute radiation sickness, malnutrition, disease and emergency prenatal or postnatal care. These public health concerns relate to a number of SDGs, such as food insecurity and water sanitation. Radioactive fallout and long-term radioactive isotope pollution would also cause long-term water and sanitation degradation and so in addition to primary health effects such as immune system damage and non-infectious diseases such as cancer and heart disease, the problems with water, sanitation and hygiene (WASH) systems would lead to secondary outbreaks of infectious diseases in the long term. Even in areas not directly affected and in locations far from the sites of nuclear detonations, public health infrastructure (human, medical and physical) could be therefore severely stressed and unable to provide basic healthcare, let alone adequate responses to severe public health emergencies. As part of the climate impacts outlined above, food shortages due to low temperatures and low sunlight levels, plus radioactive pollution, would develop over time, leading to price rises. Famine, leading to an increased incidence of malnutrition and related diseases, would be likely to result. The wealthy might be able to buy or barter the scarce food available in the competition for limited resources – exacerbating further the growing social unrest that would be likely to develop among those most severely affected.⁶⁷

44. The long-term psychosocial impacts that a nuclear detonation would cause for human populations are also crucial. Experiences of the Hibakusha from Hiroshima and Nagasaki indicate that those who survive nuclear explosions can suffer immense psychological trauma, and are often stigmatized owing to the fear in society of exposure to radiation.⁶⁸ It is also likely that many survivors would misdiagnose themselves as experiencing the symptoms of radiation sickness, putting additional early strain on already stretched public health services.

45. Public health concerns have been central to disarmament efforts for decades thanks to the sustained work of organizations such as International Physicians for the Prevention of Nuclear War.⁶⁹ A renewed interaction between the nuclear disarmament expert community and public health experts would benefit the dialogue and assist diplomatic efforts in ascertaining the full set of health risks posed by nuclear weapons use.

G. Nuclear Weapons and Non-State Armed Groups

46. The risks of nuclear weapons detonations are not limited to state actors. Non-state actors, particularly terrorist groups and lone actors, have shown clear interest in obtaining and threatening the use of WMD. Although making a

⁶⁴ World Health Organization, Ebola virus disease outbreak, <http://www.who.int/csr/disease/ebola/en/>

⁶⁵ World Health Organization, Zika Virus Disease, <http://www.who.int/csr/disease/zika/en/>

⁶⁶ Heather Williams, Patricia Lewis and Sasan Aghlani, The Humanitarian Impacts of Nuclear Weapons Initiative: The ‘Big Tent’ in Disarmament, March 2015
https://www.chathamhouse.org/sites/files/chathamhouse/field/field_document/20150331nuclear.pdf

⁶⁷ Ira Hefland, *op. cit*

⁶⁸ <http://www.ippnw.org/pdf/mgs/2-2-wilson.pdf>, p. 116.

⁶⁹ International Physicians for the Prevention of Nuclear War <http://www.ippnw.org>

nuclear device requires very specific knowledge, as well as fissile material, the capacity of non-state armed groups (NSAGs) to do this should not be underestimated.⁷⁰

47. A number of serious attempts to smuggle nuclear materials have been intercepted in recent years. For example, there have been several reported attempts to smuggle from Moldova.⁷¹ In 2011, six people were arrested in Moldova for smuggling uranium-235 estimated to be worth £18m from Russia.⁷² In addition, it is not beyond the bounds of possibilities that a non-state armed group could acquire a nuclear warhead through theft, an insider assistant or a state willing to sell.⁷³ Despite the low likelihood of such an event, the consequences would be very high and so it is deemed a high-risk event. As President Obama warned in Prague in 2009: ‘One terrorist with one nuclear weapon could unleash massive destruction.’⁷⁴

48. This concern is at the heart of the 2010-16 Nuclear Security Summits (NSS).⁷⁵ Concerns are increasing about the smuggling of nuclear materials and about NSAGs’ acquisition of fissile materials and their capability to make improvised nuclear devices. Most countries have taken the threats of NSAG attacks on nuclear facilities very seriously and are taking steps to secure their nuclear facilities against any type of attack. However, nuclear power plants and nuclear weapons sites around the world remain vulnerable, particularly to insider threats and cyber threats. From the beginning states participating in the NSS reaffirmed the ‘fundamental responsibility of States, consistent with their respective international obligations, to maintain effective security of all nuclear materials, which includes nuclear materials used in nuclear weapons, and nuclear facilities under their control’. However, for the most part, the participating states have addressed only civil nuclear materials and facilities, which account for an estimated 15 per cent of all nuclear materials, thus leaving the nuclear security risks posed by military nuclear materials – some 85 per cent of the whole⁷⁶ – not debated at the NSS.

49. The most recent and final NSS stated that the threat of nuclear and radiological terrorism “remains one of the greatest challenges to international security, and the threat is constantly evolving”. States participating took the opportunity to reaffirm their commitments to nuclear disarmament, nuclear non-proliferation and peaceful use of nuclear energy and to reducing the threat of nuclear terrorism and strengthening nuclear security.

50. The 2016 NSS presented a range of collaborative joint statements including a statement on the Comprehensive Approach to Nuclear Security and a set of agreed collaborations on a range of issues: high-density fuel development; HEU minimization;

⁷⁰ Elena Sokova and Mark Fitzpatrick, How can we push for tighter security for nuclear weapons? World Economic Forum, June 2015, <https://www.weforum.org/agenda/2015/06/how-can-we-make-our-nuclear-weapons-more-secure/>

⁷¹ Nuclear smuggling deals 'thwarted' in Moldova, 7 Oct 2015 <http://www.bbc.com/news/world-europe-34461732>

⁷² www.telegraph.co.uk/news/worldnews/europe/moldova/8607235/

⁷³ *Use of Chemical, Biological, Radiological and Nuclear Weapons by Non-State Actors Emerging trends and risk factors*, Beyzal Unal and Sasan Aglani, Emerging Risk Report – 2016, Chatham House and Lloyds <https://www.lloyds.com/~media/files/news%20and%20insight/risk%20insight/2016/cbrn.pdf>

⁷⁴ Remarks by President Barack Obama in Prague, April 5, 2009, [https://www.whitehouse.gov/the-press-office/remarks-president-barack-obama-prague-delivered](https://www.whitehouse.gov/the-press-office/2009/04/05/remarks-president-barack-obama-prague-delivered)

⁷⁵ Washington Communiqué (2016), NSS2016 <http://www.nss2016.org>; Hague Communiqué (2014), http://nuclearsecuritymatters.belfercenter.org/files/nuclearmatters/files/the_hague_nuclear_security_summit_communique_final.pdf;

Seoul Communiqué (2012), <http://www.state.gov/documents/organization/236996.pdf>; Washington Communiqué (2010), <http://www.state.gov/documents/organization/237037.pdf>.

⁷⁶ Nuclear Weapon and Fissile Material Stockpiles and Production, Global Fissile Material Report 2015, International Panel on Fissile Materials <http://fissilematerials.org/library/gfmr15.pdf>

LEU fuel bank; security of high activity radioactive sources; global nuclear security architecture; transport security; nuclear detection architecture; countering nuclear smuggling; consolidated reporting; implementation of UNSCR 1540; nuclear terrorism preparedness and response; maritime supply chain security; forensics in nuclear security; cyber security; and insider threat mitigation.

51. In addition, the Amendment to the Convention on the Physical Protection of Nuclear Material (CPPNM) will enter into force on 8 May 2016. The amendment, which was agreed in 2005, will make it legally binding on countries to protect nuclear facilities. It will also extend the CPPNM's application to nuclear material in domestic use, storage and transport. The 2005 International Convention on the Suppression of Acts of Nuclear Terrorism, UN Security Council Resolution 1540, the Global Initiative to Combat Nuclear Terrorism and the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction all supplement the efforts of the majority of states that possess nuclear materials to prevent nuclear terrorism. The energy and commitment at the most senior levels of government, industry and civil society that were dedicated to the nuclear security summit process will now be harnessed within the international frameworks – most notably in cooperation with the International Atomic Energy Agency (IAEA). Connecting nuclear security, nuclear disarmament and non-proliferation is the next step and could serve to re-energize nuclear disarmament with the same focus as expressed by President Obama in 2009 when he reiterated the US commitment to seek the peace and security of a world without nuclear weapons and outlined the basis for what became the humanitarian impacts of nuclear weapons initiative: “One nuclear weapon exploded in one city – be it New York or Moscow, Islamabad or Mumbai, Tokyo or Tel Aviv, Paris or Prague – could kill hundreds of thousands of people. And no matter where it happens, there is no end to what the consequences might be – for our global safety, our security, our society, our economy, to our ultimate survival”.⁷⁷

H. Nuclear Weapons and Humanitarian Action

52. The humanitarian action community has responded with a strong sense of significance and urgency to the issue of nuclear weapons and nuclear disarmament. Humanitarian emergencies such as those emanating from natural disasters, terrorism, and conflict, have shown how the difficulties in developing preparedness and capacity to respond to complex humanitarian situations such as overwhelming migration and refugee flows can prove insurmountable.

53. Leading the way in terms of understanding the significance of a nuclear weapons attack have been the ICRC and International Federation of Red Cross and Red Crescent Societies (IFRC)⁷⁸. Even at the height of the Cold War, when political sensitivity was high, in 1954 the Board of Governors of the Red Cross called for the prohibition of the use—absolutely and effectively—of all nuclear weapons as well as chemical and biological weapons. The ICRC continued to support nuclear weapons elimination throughout the Cold War and at the turn of the 21st century, following the failure of the CTBT to enter into

⁷⁷ Remarks by President Barack Obama in Prague, April 5, 2009, <https://www.whitehouse.gov/the-press-office/remarks-president-barack-obama-prague-delivered>

⁷⁸ Tadateru Konoé IFRC President, Towards the realization of a world free of nuclear weapons following the 2015 NPT review conference, 25th UN Conference on Disarmament Issues, Hiroshima, Japan, August 2015, <http://www.ifrc.org/en/news-and-media/opinions-and-positions/speeches/2015/25th-un-conference-on-disarmament-issues--towards-the-realization-of-a-world-free-of-nuclear-weapons-following-the-2015-npt-review-conference---ifrc-president-mr-tadateru-konoe/>

force and the nuclear tests by India and Pakistan, along with the rise of NSAG terrorism, the ICRC once again took the lead in the humanitarian community⁷⁹.

54. In 2015, the ICRC called on states that possess nuclear weapons – and their allies – to

“take immediate steps to reduce the role and significance of nuclear weapons in their military plans, their doctrines and their policies. It has become increasingly clear that these devastating humanitarian consequences raise serious doubts as to whether nuclear weapons could ever be used in accordance with the laws of war. This leads us, time and again, to the conclusion that the use of nuclear weapons must be prohibited and the weapons eliminated altogether”⁸⁰

55. Many other humanitarian organizations have made the connections and have been studying how they could – or could not – respond to a nuclear weapon detonation within the humanitarian tradition.⁸¹ The recent overwhelming flows of people who are refugees from conflict or fleeing from failed states and economic collapse and attempting to settle in Europe gives concerned organizations and governments a sense of how the humanitarian impact of a nuclear weapons attack would swamp all resources and emergency preparedness.⁸² Not only is the population displacement likely to be far larger but the immediate physical impact of large-scale burns, radiation sickness, loss of sight, loss of hearing, dehydration, other physical damage and psychological trauma could not be dealt with by any resources at the disposal of international or local humanitarian organizations of the health sector infrastructure. In addition, physical infrastructure, communications, transport, hospitals and blood banks would be destroyed or rendered inoperable and humanitarian workers would be not allowed to enter the worst-hit areas in case they were themselves subjected to radiation damage, thereby adding to the numbers in need rather than remaining a source of assistance.

56. Despite initial opposition to discussing the humanitarian impact of nuclear weapons at the World Humanitarian Summit,⁸³ states and civil society organizations have succeeded in their efforts to include nuclear disarmament in the programme, providing a model for how these issues should be connected and an opportunity to communicate with a wider set of experts.

I. Nuclear Weapons and Cyber Security

57. Cyber attacks against nuclear installations, such as the well-publicized Stuxnet worm in 2010, have increased concerns about the cyber security vulnerabilities of nuclear

⁷⁹ In a note of nuclear irony, the March 2016 updated commentary for Article 17 of the First Geneva Convention states that deaths caused by the parties to the convention should be recorded. This recording should include the identity of the person who died, the date and time of death, the cause of death and the location of death. In the case of a nuclear weapons attack however, this would have no meaning. The numbers of people dead in one instant and the ability to be able to record would be beyond the capabilities of even the most determined recorder. Every Casualty, <http://www.everycasualty.org/newsandviews/gc-article-17>

⁸⁰ Peter Maurer, President of the ICRC, Nuclear weapons: Ending a threat to humanity, 18 February 2015 <https://www.icrc.org/en/document/nuclear-weapons-ending-threat-humanity>

⁸¹ For a comprehensive review of the potential UN humanitarian response see: An Illusion of Safety: Challenges of Nuclear Weapon Detonations for United Nations Humanitarian Coordination and Response, John Borrie & Tim Caughley UNIDIR, 2014, <http://www.unidir.org/files/publications/pdfs/an-illusion-of-safety-en-611.pdf>

⁸² For an in-depth study see: Simon Bagshaw, Population Displacement: Displacement in the aftermath of nuclear weapon detonation events, Paper 4, ILPI-UNIDIR Vienna Conference Series, <http://www.unidir.org/files/publications/pdfs/population-displacement-en-619.pdf>

⁸³ <https://www.worldhumanitariansummit.org>

facilities in both the civil and the military sectors. In addition, cyber criminals, states and terrorist groups have been increasing their cyber-attack capabilities. Even if a small-scale cyber security incident were to occur at a nuclear facility, particularly at a nuclear weapons facility, it would be likely to cause serious alarm among the general public both inside the country that possesses nuclear weapons and in neighbouring countries.

58. In a recent study of the cyber vulnerabilities of the civil nuclear sector,⁸⁴ a number of recorded cyber incidents were identified and the report concluded that the cyber security risk is growing as nuclear facilities become increasingly reliant on digital systems.⁸⁵ In other work,⁸⁶ the vulnerability of satellite systems and particularly GNSS (global navigation satellite systems such as GPS) data to hacking and therefore to spoofing has been analyzed. These vulnerabilities have major implications for command and control systems for nuclear weapons and their platforms and support facilities.

59. Other research⁸⁷ is addressing cybersecurity concerns for command, control, and communications for nuclear weapons and how nuclear weapons systems will respond to a cyber attack. The uncertainties in ascertaining the impact of cyber attacks could reduce confidence in the command and control of nuclear systems and lead to false alarms or even potentially allow an adversary to take control of a nuclear weapons system. The Defense Science Board (DSB) Task Force on Resilient Military Systems concluded in a 2013 study that the US ‘cannot be confident’ that critical IT systems would work if under cyber attack from ‘a sophisticated and well-resourced opponent utilizing cyber capabilities in combination with all of their military and intelligence capabilities’.⁸⁸ In 2015, the US Director of National Intelligence named the cyber threat as the primary strategic threat to the United States and the Department of Defense has addressed critical cyber vulnerabilities through the Mission Assurance Program and developed a comprehensive cyber strategy.⁸⁹ The United Kingdom of Great Britain and Northern Ireland⁹⁰ and other nuclear weapons possessors⁹¹ are likewise seriously addressing the cyber vulnerabilities of their nuclear facilities and equipment.

⁸⁴ Caroline Baylon, Roger Brunt and David Livingstone, *Cyber Security at Civil Nuclear Facilities: Understanding the Risks*, Chatham House, <https://www.chathamhouse.org/publication/cyber-security-civil-nuclear-facilities-understanding-risks>

⁸⁵ see also Guido Gluschke, *Cyber Security at Nuclear Facilities: National Approaches*, An ISS research project in cooperation with the Nuclear Threat Initiative (NTI), http://www.nti.org/media/pdfs/Cyber_Security_in_Nuclear_FINAL.pdf?_=1445548675

⁸⁶ David Livingstone and Patricia Lewis, *Space, the Final Frontier for Cyber Security?* Chatham House, forthcoming May 2016

⁸⁷ Aleem Datto and Paul Ingram, *A Primer on Trident’s Cyber Vulnerabilities*, The British American Security Information Council, *Parliamentary Briefings on Trident Renewal Briefing No.2 March 2016*, http://www.basicint.org/sites/default/files/BASIC_cyber_vuln_mar2016.pdf; and George Chamales, *A New Approach to Nuclear Computer Security*, The Nuclear Threat Initiative, http://www.nti.org/media/pdfs/A_New_Approach_to_Nuclear_Computer_Security.pdf?_=1445875704&_=1445875704

⁸⁸ *Final Report of the Defense Science Board (DSB) Task Force on Resilient Military Systems*, <http://www.acq.osd.mil/dsb/reports/ResilientMilitarySystems.CyberThreat.pdf>

⁸⁹ The Department of Defense, *Cyber Strategy*, April 2015, http://www.defense.gov/Portals/1/features/2015/0415_cyber-strategy/Final_2015_DoD_CYBER_STRATEGY_for_web.pdf

⁹⁰ *National Security Strategy and Strategic Defence and Security Review 2015, A Secure and Prosperous United Kingdom* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/478933/52309_Cm_9161_NSS_SD_Review_web_only.pdf

⁹¹ *Le Pacte Défense cyber (Cyber Defence Pact)*, Ministry of Defence, France, <http://www.defense.gouv.fr/actualites/articles/presentation-du-pacte-defense-cyber>

60. The IAEA has taken steps to address cyber security. In 2015, it held a major expert conference on “Computer Security in a Nuclear World”.⁹² At the 2016 NSS in Washington DC, 29 States plus the United Nations signed up to a Joint Statement on Cyber Security,⁹³ which committed the governments to ensuring ‘adequate cyber security at industrial control and plant systems at nuclear facilities’. The states will participate in two international workshops on cyber security at nuclear facilities in 2016 that will enable them, and their nuclear sectors, to share good practice in managing risks to industrial control systems at nuclear sites, as well as to examine the impact of using information technology in managing safety and security aspects of plant control systems. The findings from the workshops will be presented at the ministerial segment of the IAEA International Conference on Nuclear Security in Vienna in December 2016, with the purpose of contributing to IAEA efforts to enhance cyber security at nuclear facilities. In addition, the nuclear industry at the NSS focused strongly on cyber security, an effort that also includes the nuclear risk insurance industry.

I V. Conclusions

61. Nuclear disarmament and non-proliferation are a fundamental part of the world’s international legal framework. The risks are enormous. Nuclear weapons pose overwhelming dangers to global health, development, the climate, social structures and human rights. The international community needs to join up the issues in a coherent multilateral approach, in which human security and survival of the species is placed at the centre of international decision-making.

62. This paper offers the following conclusions for consideration:

(a) The detonation of nuclear weapons – whether inadvertently or deliberately – would have disastrous immediate and long-term impacts not only in the location of the detonation but also in many others parts of the world.

(b) In the wide range of top-tier global issues progressing at the international level, there is a stark absence of any discussion on the possibility of nuclear weapons use and progress towards nuclear disarmament.

(c) The continuing existence of nuclear weapons and their associated risks, including the possibility of nuclear weapons use, is rarely if ever factored in to policy-making on the full range of issues under scrutiny by the international community despite the potential for devastating impact.

(d) It is time to link up the issues. Whether within government, international organizations or non-governmental organizations, very few people work across the spectrum of top-tier issues.

(e) Experts and officials who are working on global threats in the environmental, developmental, international law, terrorism and cyber security sectors would benefit from cross-sector approaches and regular discussion forums.

⁹² International Conference on Computer Security in a Nuclear World: Expert Discussion and Exchange, IAEA,

Vienna, Austria, 1 – 5 June 2015 <http://www-pub.iaea.org/iaeameetings/46530/International-Conference-on-Computer-Security-in-a-Nuclear-World-Expert-Discussion-and-Exchange>

⁹³ The Joint Statement on Cyber Security, <http://www.nss2016.org/document-center-docs/2016/4/1/joint-statement-on-cyber-security>

(f) Connecting the expert and diplomatic communities that work on nuclear weapons and climate change could yield new perspectives and understanding, with the potential for generating practical ideas on ways to move forward.

(g) No country can consider itself exempt from the potential consequences of nuclear weapons detonations and the impact on human development. Progress on nuclear disarmament should be factored into monitoring progress on the SDGs.

(h) The gap in treaty law to control and eliminate nuclear weapons needs to be addressed.

(i) Because women are biologically more vulnerable than men to the harmful effects of radiation, they have distinct issues to raise in negotiations.

(j) Consideration of the impact of nuclear weapons on important cultural artefacts and ways of preventing such catastrophic damage should be part of the requirement for cultural heritage protection in every country and the subject of informed public debate.

(k) A renewed interaction between the nuclear disarmament expert community and public health experts could assist diplomatic efforts in ascertaining the full set of health risks posed by nuclear weapons use.

(l) Connecting nuclear security, nuclear disarmament and non-proliferation could serve to re-energize nuclear disarmament.

(m) Humanitarian emergencies such as those emanating from natural disasters, terrorism, and conflict, have shown how the difficulties in developing preparedness and capacity to respond to complex humanitarian situations such as overwhelming migration and refugee flows can prove insurmountable.

(n) Concerns about the cyber security vulnerabilities of nuclear facilities in both the civil and the military sectors are increasing.

(o) The 20th anniversary in September 2016 of the negotiation of the Comprehensive Test Ban Treaty – the most recent achievement of the Conference on Disarmament – could serve a focal point for reflection on ways forward.

(p) Experts and officials from other Main Committees of the UN General Assembly could be engaged in an annual discussion on cross-sector threats and responses and ways forward linking the issues of development, gender, international law, the environment and terrorism.

(q) Going further, it ought to be possible to hold regular joint meetings of the Main Committees to discuss issues of common concern and inform the need for action.

(r) Experts and officials from other fields could be invited to address meetings of the NPT, the Open-Ended working Group (OEWG) and the First Committee of the UN General Assembly to ask and answer questions about the intersection of nuclear disarmament and non-proliferation efforts with their areas of focus and expertise.

(s) Joint studies could be commissioned between experts in different fields on the full set of impacts that nuclear weapons detonations might have on development in a specific region.

(t) The issue of the risks of nuclear weapons could be introduced as working papers into the main forums of other global issues, including the World Humanitarian Summit and follow-up meetings, conferences on climate change, discussions on development and cyber security.

(u) The vulnerabilities of and risks associated with nuclear weapons, their infrastructure and their continued existence in the current global context need to be taken into account in all security and emergency planning. A response to nuclear emergencies should be included in all national and international risk management and mitigation processes. This should include an examination of the national and international capacity or otherwise for a humanitarian response, particularly in the nuclear weapons possessor states and those that have nuclear weapons on their territory.
