

Nuclear disarmament: then and now

Rebecca Johnson highlights the limited progress in nuclear disarmament since the end of the Cold War. Nevertheless, she argues that new academic research can help to reframe nuclear threats, providing future opportunities for more effective international initiatives to ban nuclear weapons.

While media in some countries carry stories about Iran's nuclear ambitions, most people in the world (including many that jammed city streets for nuclear disarmament in the 1980s) think nuclear threats disappeared or greatly diminished when the Cold War ended. As a growing number of leaders, including President Obama, evoke the vision of security in a world without nuclear weapons, a new civil society movement, including progressive scientists and physicians, is coming to the fore with practical and transformative ideas about how nuclear weapons can be banned and eradicated – in our lifetimes!

More than 20 years since the end of the Cold War and the elimination of the nuclear-armed Cruise and Pershing Missiles and SS20s under the 1987 Intermediate-Range Nuclear Forces Treaty, there are still over 19,000 nuclear weapons in the world.¹ This is considerably less than the 70,000 nuclear weapons in US and Soviet arsenals in 1986, but there are now more nuclear-armed states (at least nine according to non-proliferation assessments) and several potential proliferators.

There has been recent progress codifying reductions in the deployed strategic arsenals of Russia and the United States through the 2011 New START Treaty. In addition, the five nuclear weapon states recognised by the Non-Proliferation Treaty (NPT) have instituted a 'P5' process to talk about nuclear weapons issues such as transparency and confidence-building. Nevertheless, it is clear that traditional arms control and non-proliferation measures have not progressed very far in the past 15 years. The Comprehensive Test Ban Treaty (CTBT) negotiated during 1994-96 has still not entered into force, despite being signed by 183 countries and ratified by 157.² The 66-member Conference on Disarmament in Geneva, which negotiated the CTBT after concluding the 1993 Chemical Weapons Convention, has been paralysed since 1997. Despite adopting a mandate to negotiate a ban on the production of fissile materials in 1995, the Conference has been unable to sustain more than a few weeks of negotiations on this measure in 18 years, due to a toxic combination of political and structural factors.

Stuck in the past

Most disarmament and non-proliferation efforts since 1995 continue to be stuck in a 'numbers game' that is dominated by the Cold War powers. The conduct and limited objectives of this approach bear little relation to how the concepts and practices of international relations, strategic stability, human and global security and attitudes towards nuclear deterrence, proliferation and use have been changing since 1991. The debates in the military-defence establishments of the USA, Russia, Britain and France cling to out-dated assumptions about the defence role and indispensability of nuclear weapons, including their doctrines and operations, as if the weapons still had the utility and cachet assigned to them in the 1950s-1970s. All four of these nuclear-armed states expect praise for much touted (but strategically marginal) reductions in their arsenals, while they continue to devote significant funding to modernising their design capabilities and laboratories for renewing, developing, refining and testing their nuclear weapons systems – even claiming that such expensive developments are necessary for them to comply with the CTBT. Similarly, in order to achieve ratification of New START by the US Senate, the Obama administration felt it necessary to promise an additional \$85 billion for the US nuclear labs. Such trade-offs are pernicious because they ensure that there are ongoing financial, industrial, scientific and political vested interests in continuing make, deploy and incorporate nuclear weapons in security thinking. This is despite the growing realisation by thoughtful sections of the military and political establishments that nuclear weapons cannot (and must not) be used, and that they are far more of a security liability and a threat to stability than an asset. China has yet to demonstrate leadership in disarmament, but it is interesting to note that, notwithstanding its huge strides technologically and economically in recent years, Beijing has chosen to retain its longstanding positions on nuclear use, deterrence and the maintenance of a relatively small and de-alerted arsenal. (These positions used to be regularly dismissed by Western analysts as doctrinal rationalisations to compensate for economic and nuclear limitations.) At base, however, the P5 behave as if they are in a fantasy world where they can issue rhetorical visions of a world without nuclear weapons while indefinitely possessing and modernising their own nuclear arsenals and somehow closing the door to proliferators.

Political game-changer

That's the disappointing news. The future looks considerably more interesting, and science and

scientists have an important role to play. Faced with the disconnect between 'nuclear free world' rhetoric from leaders and nuclear business-as-usual from military-industrial decision-makers, compounded by group-think and collusion by many arms controllers, progressive elements from civil society and governments are now mounting a new challenge. They are leading a process to demonstrate that nuclear weapons are a global humanitarian problem that cannot be safely managed, and that a treaty banning at least their use, deployment and production is a necessary and achievable step towards their total elimination.

Three important elements in this humanitarian-centred approach to nuclear abolition are:

1. updated scientific studies showing that 'nuclear winter' and widespread famine would occur if only a small fraction of today's arsenals were used against cities in a regional war;
2. progressive delegitimisation of nuclear weapons and doctrines. These include academic challenges to the justifications trotted out by nuclear-dependent governments that these weapons of mass destruction are useful or necessary for deterrence, national security and 'ultimate insurance in an uncertain world'. In addition, the combination of economic pressures and opportunity costs have drawn into the open many military practitioners' scepticism about the utility of nuclear weapons;³ and
3. growing recognition that a treaty banning nuclear weapons is a practical and achievable near-term objective that can be led by non-nuclear governments, and would be a transformative game-changer to accelerate the elimination of current arsenals. Such a treaty would go some way to reducing the value attached to getting and keeping nuclear arms, as well as overcoming the deficiencies in the NPT, whether or not the nuclear-armed states are on board from the beginning.

Nuclear famine

Soviet President Mikhail Gorbachev was persuaded to kick-start disarmament talks in the mid-1980s by US and Soviet scientists who demonstrated that nuclear war would cause planet-wide 'nuclear winter'.⁴ Such studies have now been updated with data derived from climate change research and calculations based on the use of only a small fraction of today's arsenals in a 'limited' or regional nuclear war.^{5,6} Researchers used a scenario of war between India and Pakistan in which a hundred Hiroshima-sized bombs (small by today's

standards and amounting to just 0.04% of the nuclear explosive power available to the nuclear-armed states in 2011) are used on urban areas. The research demonstrated that the explosions and fires would propel millions of tonnes of soot, smoke and debris into the upper atmosphere, darkening the skies, causing temperatures across the planet to fall by an average of 1.25°C, and disrupting rainfall. These effects could persist for over a decade, with devastating consequences for agriculture and the health and life-cycles of many species. Building on this research, physicians such as Ira Helfand from the Physicians for Social Responsibility and the International Physicians for the Prevention of Nuclear War (IPPNW) have conducted analyses of the health and humanitarian consequences if nuclear weapons were used in a regional war in today's conditions. Bearing in mind increases in global population and urbanisation since the 1980s, Helfand and others have concluded that in addition to the millions that would die from the direct effects of the nuclear detonations on South Asia's major cities, over one billion people around the world would be put at risk of starvation and death due to famine, epidemics of infectious diseases and other health and security disasters that breed on the backs of large-scale hunger and malnutrition.⁷

Political initiatives and responses

Studies such as these have helped to reframe the debate and bring new thinking to the table. In November 2011, the Red Cross adopted a groundbreaking resolution on nuclear weapons. Expressing concern "about the destructive power of nuclear weapons, the unspeakable human suffering they cause, the difficulty of controlling their effects in space and time, the threat they pose to the environment and to future generations and the risks of escalation they create", the Red Cross called for "negotiations to prohibit the use of and completely eliminate nuclear weapons through a legally binding international agreement".⁸

A few months later, Norway's Foreign Minister Jonas Gahr Støre announced his intention to convene an international conference on the humanitarian consequences of nuclear weapons in Oslo in spring 2013. Following this, 16 states participating in the NPT Preparatory Committee meeting in May 2012 presented a joint statement on the humanitarian dimension of nuclear disarmament, which quoted from the Red Cross and called for states to "intensify their efforts to outlaw nuclear weapons and achieve a world free of nuclear weapons".⁹

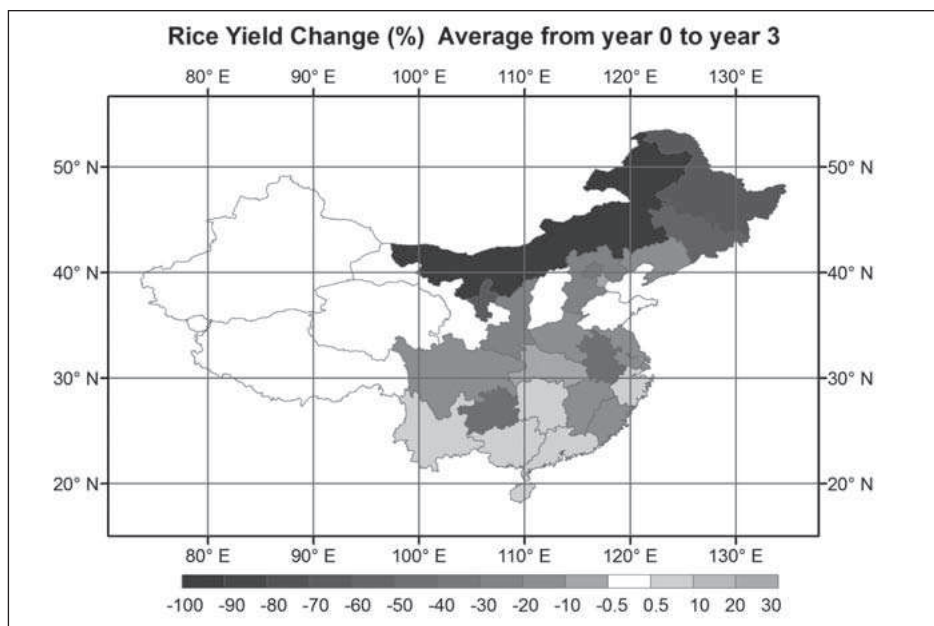


Figure 1. Map of projected rice yield reductions (%) in China for the first 4 years after nuclear conflict between India and Pakistan.⁷ Very large negative changes are seen in most areas, with only a few areas experiencing a small increase. White regions are provinces for which model simulations were not conducted.

Despite the growing importance of humanitarian concerns and pressure for a nuclear abolition treaty being signalled in the 2010 NPT Review Conference,^{10,11} nuclear-armed governments appear to be surprised by these developments. They have typically deployed three kinds of arguments in opposition:

- that the only practical disarmament steps are the ones they are already engaged in;
- that their nuclear deterrence policies mean that they possess nuclear weapons in order for them not to be used; and
- they try to diminish the relevance of international humanitarian law by reducing it to the 8 July 1996 Advisory Opinion of the International Court of Justice, which, they say, did not conclude that the use of nuclear weapons would violate international law in all circumstances.

It is too early to judge whether reawakening concerns about the humanitarian consequences of nuclear weapons will change the political context sufficiently to drive more substantial and effective progress towards nuclear disarmament. Those looking through the traditional lens of strategic stability and arms control, which includes most people in the policy establishments of the nuclear-armed states, maintain that states with nuclear weapons have primary security interests and have to be the main actors in nuclear disarmament. Humanitarian and human-security approaches by contrast make disarmament an equal responsibility for the nuclear-free countries.

Only nine countries are capable of launching a nuclear attack but the consequences of even limited uses would be globally devastating. So everyone has direct and primary security interests in prohibiting the weapons and preventing their use.

At present, possession implies deployment implies doctrines and operations for use (necessary for signalling 'credible deterrence'). The non-nuclear countries know their role in the physical elimination of the arsenals will be marginal, but the humanitarian approach emphasises their rights and responsibilities to strengthen the international and legal obligations. A growing number now argue for a multilateral treaty to ban the use, deployment, production, transfer and proliferation of nuclear weapons. Negotiations involving nuclear possessors will at some stage need to work out the provisions, conditions, timelines and verification requirements for eliminating the weapons completely, but history teaches that this is more likely to become feasible when the weapons have lost their strategic value and their use and deployment are outlawed.

Want a 'nuclear free world'? Time to ban the bomb!

As we have seen with the Chemical Weapons Convention, the 1997 Mine Ban Treaty and the 2008 Cluster Munitions Convention, many effective treaties start with highlighting the consequences of use. If the Conference on Disarmament remains blocked, treaties can be initiated by groups of concerned

governments and carried forward to conclusion, adoption and entry into force through other multilateral processes. Even if not all of the countries possessing the weapons of concern join the treaty, they become progressively constrained by its provisions and legal status.

Humanitarian disarmament approaches do not undermine current arms control or present a 'nuclear weapons convention' as the only answer. By focussing on use rather than numbers, they aim to delegitimise and outlaw the weapons. International legal recognition that nuclear detonations would violate international law and be treated as a crime against humanity would greatly increase the political and legal pressure on nuclear armed states to take their weapons off deployment and undertake the necessary steps to dismantle and eliminate them.^{12,13} Compared with the nuclear threats, policies and arsenals still around more than 20 years after the Berlin Wall was pulled down, reinvigorating nuclear disarmament and changing the status quo would be a major step forward.

Dr Rebecca Johnson is Executive Director of the Acronym Institute for Disarmament Diplomacy – <http://www.acronym.org.uk/> – and Vice Chair of the International Campaign to Abolish Nuclear Weapons (ICAN).

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Sustainable building materials: how eco-friendly are they?

Insulation has little 'wow' factor compared to solar panels, but greater potential to reduce carbon emissions cheaply. However, it is crucial that we consider the energy required for their manufacture: natural, non-toxic materials consume the least energy and are safer for human health, argues Tom Woolley.

There is general acceptance of the need for buildings to be well-insulated but much less awareness of the wider environmental and social impact of mainstream insulation materials. New buildings must meet high energy-efficiency standards, and the UK government is also introducing the new – but somewhat flawed – Green Deal scheme to encourage greater retrofitting of existing buildings. While there is a strong case for increasing our use of renewable energy sources to help to reduce carbon emissions – although less so for micro-renewables on individual houses – improving the fabric of buildings is a far cheaper and more effective way.

The importance of establishing a thermally efficient building envelope, a concept known as 'fabric first', is accepted by many experts, but there is a surprising lack of expertise in how best to insulate buildings. For many, insulation is insulation: it does not matter what you use as long as the insulation supplier says it has a good thermal resistance. However, insulation materials perform differently and some are not appropriate for renovation. Furthermore, manufacturers' claims about thermal performance can be misleading; a product may not perform as well once it is installed.

Embodied energy of insulation materials

Insulation should be selected according to strong environmental criteria. The market is dominated by synthetic materials, many of which are made from petrochemicals and contain toxic chemicals that may harm the indoor environment. They also present a pollution hazard when disposed of in landfill. The

energy required to manufacture, transport and install them – called the embodied energy – is largely ignored by energy efficiency advocates. Bodies like the AECB (now also known as the Sustainable Building Association), which used to promote use of ecological building materials, now support the use of synthetic materials and argue that the damage these materials do to the environment can be justified by the energy they save over the building's lifetime.¹

However, there is growing evidence to the contrary, as recently demonstrated by work in Finland² which examined the total energy used in the early stages of building construction, called the 'carbon spike'. The carbon spike can outweigh the energy efficiency savings over the lifetime of a building. De Selincourt³ argues that this problem is a "ticking time bomb", as carbon emissions during construction will enter the atmosphere sooner and cause warming earlier than emissions during operation. Work in the UK on the