Impact on economy and development
Estimating the economic consequences of a nuclear weapons explosion: Critical factors

Introduction

While the physical effects of the explosion of a single nuclear weapon are relatively straightforward and have long been understood, estimating the economic consequences is a much more complex, contingent, and interdependent problem. There are three broad categories of costs: 1) those related directly to the destruction the bomb causes; 2) those related to economic disruption that a detonation creates; and 3) those related to the reaction an explosion provokes. Destruction costs include the loss of productive economic activity due to the injury and death of the human victims; the damage done to equipment, buildings and other physical structures, including key elements of the economic infrastructure (such as power plants, roads, water supply, and waste treatment systems); decontamination, decommissioning, and debris disposal; and the costs of evacuating and sheltering survivors. Disruption costs include the loss of key suppliers to or customers of economic enterprises outside the zone of destruction, damage to critical nodes of the power grid, the financial system, and the communications and transportation networks, among others; and the loss of key facilities and personnel with critical skills (such as hospitals and health care professionals) on which those outside the zone of destruction also depend. Reaction costs include the cost of increased safety, security and surveillance measures aimed at preventing future occurrences, loss of privacy, freedom of movement and perhaps other freedoms associated with those measures, and costs related to any actions taken against those believed responsible.

Along with being affected by the size of the weapon involved, all of these costs are affected to a greater or lesser degree by whether the explosion is the result of an accident, a terrorist act, or a military attack. At first thought it might seem that destruction costs would depend on the size of the weapon, not the nature of the incident. However, the nature of the incident profoundly affects where the explosion occurs. An accident could happen almost anywhere nuclear weapons are stored, deployed, or moved. Some locations might be fairly remote and would tend to have relatively low damage costs associated with them; other locations are much closer to centers of population and economic activity and would impose much higher costs. But terrorist or military targets would be deliberately chosen to try to impose heavy costs on the targeted nation. The same reasoning also applies to disruption costs. Similarly, reaction...
costs would be very different if the explosion were the result of an accident rather than a terrorist or a military attack.

The major physical effects of a nuclear weapons explosion include blast, fire, prompt radiation, radioactive fallout, and electromagnetic pulse (EMP). Blast and fire, which depend on the power and design of the weapon involved, are responsible for the damage done to physical structures in the strike zone, and toxic contamination from the burned debris itself, for much of the death and injury of people within that zone. They are therefore a major source of destruction cost. Radioactive fallout spreads out in a plume from the site of the explosion, and the direction of which depends on the power of the weapon and prevailing winds. It may cover an area of hundreds of miles from the detonation. 9 Depending on the dose they receive, fallout can kill, sicken, or shorten the lives of those people exposed. 9 While it does little if any direct damage to buildings and other physical structures, it can contaminate them with radiation as to make them use problematic, if not impossible for an extended period of time. It can also prevent first responders from entering areas within the zone of destruction to put out fires and rescue trapped individuals, thus increasing the damage done by the strike, and with it, destruction costs. An EMP, essentially a powerful voltage surge, does not kill people or destroy structures, but is strong and fast enough to permanently disable most modern electronic equipment on which our economic system and way of life increasingly depend. The extent of damage done by the electronic equipment on which our economic system and way of life increasingly depend.

The cost of replacing the contents of the destroyed buildings, including the technology and fixtures, has been estimated to be $5.2 billion. 10 Including the repair of communications, transportation, and power infrastructure, "the total physical losses sustained in the attack [are estimated] to be about $21 billion. 11" The estimate of direct property losses caused by Hurricane Katrina in Orleans Parish, 12 it is likely that an accident, terrorist assault, or military attack involving the explosion of a single weapon and subsequent radioactive contamination would do comparable or even greater physical damage to the city than a city like New Orleans, and destroy many times that much physical capital in a city like New York. 13 The economic costs of recovery include more than the replacement of structures, machinery, and equipment and the care of injured survivors. It also includes costs associated with many industries might reabsorb surviving industries if the strike zone would be greatly diminished, especially if conditions (such as radiation levels) make it difficult for outside responders to gain access. This might magnify short and perhaps long term productivity losses, and therefore associated economic costs.

Economic costs of destruction

The attack launched against the World Trade Center on the 9/11 attacks. The immediate area of the explosion. Radioactive contamination would render intact facilities and equipment usable within the potentially extensive radiation plume for a period of time ranging from days to years until radiation levels naturally decay or are sufficiently reduced by purposeful decontamination. The ability to use existing structures or equipment would also depend on whether or not they can be repaired at reasonable cost. For producers, loss of physical capital includes damage to or destruction of office space, industrial centers, research facilities, transport centers, and associated equipment. For consumers, losses include damage to or destruction of their homes, vehicles, schools, and places of worship. Both will incur costs due to the loss or damage to retail space, public transportation infrastructure, as well as components of the power grid and communication networks, and water and waste treatment facilities. According to the Federal Reserve Bank of New York’s published study of the economic losses due to the destruction, destroyed or damaged buildings in the World Trade Center complex and adjacent areas is estimated to be $11.2 billion. 14 The cost of replacing the contents of the destroyed buildings,

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In 2005, Rechimuth et al. conducted an analysis for the Pacific Northwest National Laboratory of the economic consequences of an attack with a single nuclear weapon. 16 Their study was focused on the sensitivity of the costs imposed to the cleanup standards involved. They considered a range of nuclear weapons sizes (0.5KT, 13 KT, and 100KT) along with a large "dirty bomb"—a device designed to scatter radioactive contamination over a large area and produce more severe contamination than a nuclear weapon. The targets were considered, ranging from a rural town to a high-density urban area. Then they evaluated the costs associated with five levels of post-attack decontamination, ranging from reducing radioactive exposure to a continuing 15 millirems per year (a relatively stringent standard set by the Environmental Protection Agency) to a much less rigorous cleanup standard of 5,000 millirems per year exposure (a Nuclear Regulatory Commission standard for workers). Assuming efficacious disposal of radioactive waste, their estimates of the costs of decontamination and decontamination ranging from 93 million dollars for the smaller size for or range land to $2.7 billion per square kilometre for a high density urban area. 16 Their overall conclusions? For an attack with a nuclear weapon or large "dirty bomb," "economic consequences ... are highly dependent on the selected cleanup level. Because such an event could potentially spread contamination very widely, even an event in a 'remote' location could have huge economic consequences." 17
One of the less discussed effects produced when a nuclear weapon explodes is known as an electromagnetic pulse (EMP). Though not as dramatic or obvious as the blast, fire, and radiation effects, an EMP would wreak havoc on the electronic equipment on which the economy and our way of life have become thoroughly dependent. According to a paper published by the National Academy of Sciences, discussing the EMP, “the problems this pulse poses for electronic equipment are twofold. Electric power grids would pick up the EMP and transmit a transient spike in voltage to equipment drawing power at the time of the detonation. The rapid rise in voltage would damage microprocessors in a way similar to that resulting from lightning strikes. However, the rise in voltage would be typically 100 times faster, thereby rendering common surge protectors ineffective. Second, the electronic equipment itself could pick up the pulse and generate internally induced currents. The result would produce physical damage to the equipment.”

The reach of the EMP effect depends on the altitude at which the nuclear explosion occurs. An explosion of a powerful nuclear weapon 21 kilometers or more above the earth could produce an EMP that would cover hundreds of thousands of square kilometers. In fact, a high-yield weapon detonated 200 miles (about 322 km) above Kansas would generate a pulse which would affect the entire country (energetic US) plus parts of Canada and Mexico. Furthermore, the entire region would be blacked out simultaneously, since the EMP radiation produced by the explosion travels at the speed of light. The economic and social ramifications of disrupting a highly developed electronics network would be staggering. Not a single facet of the economy would escape the effects of an interruption to the normal flow of communications, data retrieval, and the accompanying capacity to process vast amount of information.

Even if only a portion of Gulf Coast production and refining capacity were lost in a nuclear strike, given the extent to which the US relies on gasoline for transportation and natural gas for other critical uses, a severe jolt would be delivered to the nation’s economy. The US economy relies on foreign sources for nearly half of total petroleum and petroleum liquids. Should an attack remove 5% of refined crude oil, the US economy would be more than half of foreign petroleum and petroleum liquids. Should a nuclear attack remove 5% of refined crude oil, the US economy would be hard hit. The world automotive industry alone saw production fall by 5% when those words were written. And electronic components “fried” by an EMP would be rendered permanently useless and therefore have to be replaced.

According to the 2008 report of the EMP Commission, we could expect most personal and business computers to fail because they do not have hardened electronic components. Even a small EMP attack, they would be “rendered permanently inoperable until replaced or physically repaired.” The US military estimates that 60-80% of the nation’s total energy demands and more than 99% of the fuel used by Americans in their cars and trucks, while 90% of the next 1000 US power plants are projected to use natural gas... The oil and natural gas industry is one of the largest employers in the country.

Changes in airline travel have included longer lines, removing shoes and coats, limiting liquids, being screened and occasionally searched. As a result of screening procedures, various industries depend on a daily basis are vulnerable to serious damage or destruction by EMP.

Under any circumstances, the explosion of a nuclear weapon on the territory of any state would certainly provoke a reaction, but the type and extent of that reaction would be highly dependent on the surrounding circumstances. If it were the result of an accident involving the target country’s own nuclear forces, there would certainly be a high priority investigation into the causes of the accident. Depending on what that investigation disclosed, there might be punitive measures meted out to those responsible. There would be serious consequences for procedures followed in handling the weapons or even redesign of equipment (including the weapons themselves) in an effort to prevent such a disaster from ever recurring. But the costs of reaction would be relatively minimal compared to likely reactions in the event the detonation was the result of a deliberate terrorist or military attack.

The non-nuclear terrorist airborne attacks on the World Trade Center and the Pentagon on 11 September 2001 profoundly altered the US approach to terrorism and public and private perceptions of national security that was required to keep the country safe, though those attacks did not do nearly as much damage as they would have had a nuclear weapon been involved. The clearly terrorist-driven events of 9/11 provoked an enormously expensive series of reactions. In addition to relatively low cost modifications of aircraft (e.g. special locks installed on the cockpit door), there were modifications in security measures ranging from the inspection of each passenger boarding procedure to the hiring of security personnel at airports around the world to time consuming boarding procedures. According to The Economist, citing a paper by Mueller and Stewart, “America has increased homeland security spending by more than $1 trillion in the decade since the 9/11 attacks... By 2001... America’s spending on counterterrorism overspent all anti-crime spending by some $15 billion.”

Economists and even national security experts do not even include the costs of the US and Afghanistan (which they call “terrorism determined”) in their trillion-plus tally. These costs would be even higher if they included the long-run costs of the wars in Afghanistan and Iraq launched by the US in reaction to the acts of terrorism committed on 11 September 2001. The most terrible cost of those two wars has been the hundreds of thousands of civilian deaths, including women and children killed, wounded or displaced, many of whom were not even in the war zone; the US military has conducted 34,000+ combat missions in Afghanistan, including 464 nuclear bomb equivalents; it is by no means certain that the country struck react by launching a lengthy war(s) or even a nuclear attack... it is by no means certain that the country struck would react by launching a lengthy war(s) or even a nuclear attack.

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Conclusion

Whether it is the result of an accident, a terrorist attack, or a military strike, the explosion of a single nuclear weapon on the territory of any nation would impose economic costs at least equivalent to, and most likely well beyond, the costs of a major natural disaster. Our past experience with large-scale natural and human-induced disasters tells us by analogy that the resulting economic costs depend strongly on the population density and the nature and extent of economic activities carried out in the zone surrounding the site of the explosion. In a key urban area, the costs of the immediate destruction and long-term economic disruption inside and potentially far outside of that area could easily run into tens of billions—and possibly as high as hundreds of billions—of dollars.

Were this disaster to be the result of a deliberate attack, it is not difficult to imagine that extraordinary pressure would be generated for the government of the country struck to take some form of needle action in response. Whether imposed by that action would almost certainly be high, and should it degenerate into all-out war between two nuclear-armed rivals, the costs would be virtually incalculable.
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In sum, unless it occurred in a very remote, lightly inhabited and economically inconsequential area, the explosion of even a single nuclear weapon on the territory of any state as the result of an accident or deliberate attack would be a high-cost economic disaster, something we should bend our best efforts toward avoiding. But can such an event be permanently avoided in a world still populated with thousands of nuclear weapons, terrorist groups willing to use means of mass destruction, and an increasing number of nuclear-armed nations?

In 1996, the government-sponsored Canberra Commission, peopled by an impressive array of former high military and government officials from four of the then five major nuclear weapons states, issued its report. The lengthy report argues, "The proposition that large numbers of nuclear weapons can be retained in perpetuity and never used—accidentally or by decision—defies credibility. The only complete defense is the elimination of nuclear weapons and assurance that they will never be produced again."[31]

The many billions of dollars of economic cost that even a single nuclear explosion in a major urban area would impose gives us one more reason to take seriously the call to move strongly and without delay toward the reduction and long overdue abolition of nuclear weapons.

Notes:

1. There have been many major accidents relating to weapons of mass destruction. J.F. Damon, The Technology Trap: Where Human Error and Malevolence Meet Powerful Technologies (2010), Santa Barbara, CA: Praeger/ABC-CLIO. See Chapter 4 for an analysis of such accidents and the Appendix to Chapter 4 for a listing of over 100 publicly reported serious accidents that occurred 1950–2009. See also Chapter 2 for an analysis of the prospects of terrorists acquiring nuclear weapons and other means to commit acts of mass destruction and the kinds of terrorist groups most likely to find such acts appealing.

2. For example, the radioactive plume from the explosion of a 100 kiloton (kT) nuclear weapon on San Ysidro in the far south of California could reach up to the southwestern corner of North Dakota. B. Reichmuth, S. Short and T. Wood, Economic Consequences of a Real-Nuc Attack: Cleanup Standards Significantly Affect Cost (2001), Pacific Northwest Laboratory, PNNL-SA-48286, April, p.8.

3. Exposure to radiation sharply increases the risk of deadly cancer as long as decades after exposure.


5. Ibid. Derived in part based on data in this source.

6. Ibid.


9. Ibid.


11. At this writing, the costs of the so-called "supertornado" that struck the northeast coast of the U.S. in late 2010 are still being assessed, but appear to rival those of Hurricane Katrina.


14. Ibid., Table 1, p6

15. Ibid., p.512


17. Ibid.

18. Ibid., p. 543


20. Ibid., p.166

21. Ibid., p.191


24. See also, for example, K. Ziemke, Gasoline Runs Short, Adding Woes to Storm Recovery (2012) New York Times


32. Ibid.


34. Ibid.


37. Ibid., Executive Summary, paragraph 2.
This chapter will seek to explore how the use of nuclear weapons—whether a single detonation or a nuclear war—could exacerbate poverty and inequalities and undermine the achievement of the Millennium Development Goals (MDGs). The chapter will rely on data from other disasters, including natural disasters, the Chernobyl and Fukushima nuclear disasters, and nuclear testing in the Marshall Islands in order to extrapolate possible implications of the use of nuclear weapons on development. This chapter does not draw concrete conclusions because none of the aforementioned case studies or disaster scenarios have the same effects as the use of nuclear weapons. Instead, it will explain how disasters gravely exacerbate development challenges from reducing poverty to building infrastructure to promoting gender equality and will suggest how the use of nuclear weapons could have such effects.

Disasters and the economy

Disasters affect the achievement of development goals through loss of lives, livelihoods, and infrastructure, but also through the diversion of funds from development to emergency relief and reconstruction and broader effects on the economy. The use of one or more nuclear weapons would in most cases have graver effects than those of natural disasters or other types of nuclear disasters. Hypothesizing on the use of a 10-kiloton nuclear weapon on the Port of Long Beach in California, USA, a 2006 study by the RAND Corporation found that in addition to loss of lives and homes, damage to port and surrounding infrastructure, displacement of local residents, and the cost of worker compensation claims, there would also be severe impacts on the global shipping supply chain and thus the global economy. The authors argue that there would likely be an immediate call to close all US ports to incoming traffic and mass exodus from US port cities of local populations. Just the closure of the Long Beach port alone, which handles 30 percent of US shipping imports (by value in 2003), would lead to severe disruption of the supply of basic goods and petroleum in the United States. The port also handles about 7.5 percent (by value) of world trade activity. Thus, the authors note, “there is a high probability that the Long Beach scenario would have large economic consequences at great distances from the initial nuclear explosion.”
Dumas and Nelson further explore the economic consequences of a nuclear weapon explosion in this collection. What is important to note for this chapter is the relationship between the global economy and issues of development, poverty, hunger, and equality. The use of nuclear weapons would affect all of these issues independently and in the relationship between these issues and the global economy. Interventions to the supply of food and petroleum within the country where the nuclear explosion has occurred, disruptions to the global supply of goods and the impact that

Thus a nuclear explosion or nuclear war would take place in a context that is already challenging for meeting the MDGs and rife with international and domestic inequalities. And while a nuclear weapon explosion will not discriminate between rich and poor in its immediate impact, its long-term consequences will.13

has on the local economy, the business sector, and the stock market; damage to infrastructure, lives, and livelihoods; and resulting forced or voluntary migration—all of these have direct impacts on the levels of poverty and development in the affected country.

Global economic recession—a likely effect of the use of nuclear weapons—further undermines progress towards achieving the MDGs. Direct development aid is reduced due to perceived budget constraints in developed countries, while the recession also slows or ends economic growth in developing countries. The International Monetary Fund estimated that the global economy contracted by 0.6 percent in 20092 and that economies of developing countries contracted by 1.8 percent. The World Bank estimated that an additional 64 million people would fall into extreme poverty as a result of the global recession.3

The broader context

As things stand now, projections indicate that by 2013 about one billion people will be living on an income of less than US$1.25 per day, the World Bank's measure of extreme poverty.4 It is widely anticipated that most of the MDGs will not be met by the 2015 deadline.5

However, the 2010 MDG Report produced by the United Nations warned that "unmet commitments, inadequate resources, lack of focus and accountability, and insufficient dedication to sustainable development have created shortages in many areas." It is widely anticipated that most of the MDGs will not be met by the 2015 deadline.

While this is partially due to the failure of developed countries to meet their 0.7 percent aid pledge, it is also largely due to the concept and process of development promoted by the international financial institutions responsible for much of the aid to developing countries. Even as (inadequate) efforts are made to reduce poverty, inequality between the wealthy and the poor continues to rise. More than 70 percent of the world's income goes to 20 percent of the world's population. A 2011 study by UNICEF estimates that under the current rate of change it would take 800 years for the poorest billion people to achieve ten percent of global income.16

Development as envisioned by the mainstream financial institutions entails building institutions and implementing policies that allow for a country to participate in the global capitalist economy. However, given the inherent inequalities of economic globalization and the policies of international institutions that serve to entrench these inequalities through structural adjustment programmes and other neoliberal reforms, many countries continue to struggle to meet their objectives related to poverty, education, health, and more. As the report Disaster risk reduction: a developmental concern argues, mainstream development models "place too much faith in the ability of unregulated markets to create favourable conditions for human development, pressure for reduction in state functions, an unfair global trading system which allows export 'dumping' and barriers to market access to persist, and inadequate and shrinking development assistance often deployed in the interests of donor countries."17 UNICEF similarly questions the current development model, pointing out that it has allowed the wealthiest billion to accrue the most income. Its 2011 study argues that equity must be placed at the centre of the development agenda.18

Thus a nuclear explosion or nuclear war would take place in a context that is already challenging for meeting the MDGs and rife with international and domestic inequalities. And while a nuclear weapon explosion will not discriminate between rich and poor in its immediate impact, its long-term consequences will.13

Within countries, "the poorest populations are the most vulnerable to disasters as they are often left to settle on the riskiest locations and have least access to measures of prevention, mitigation and preparedness." Disasters tend to exacerbate poverty because the poor are disproportionately affected by post-disaster inflation and by cuts in social spending.19 After a disaster, most governments reallocate funds from capital and social expenditure to cover expenses related to clean-up and reconstruction and most donor countries reallocate resources from development to emergency relief.20

In the aftermath of any major disaster people are typically displaced from their homes for varying amounts of time. In developing countries in particular, displaced people often add to the swelling populations of informal settlements or end up in refugee camps, further undermining development strategies. A UK study suggests, "Lack of adequate livelihood resources in these new settlements can magnify risk as the immediate environment is exploited for resources such as firewood leading to soil loss and potentially increasing flood or landslide hazard." It also notes that high density living inside of camps and informal settlements increases exposure to disease.21

As has been shown in the Marshall Islands, Fukushima, and Chernobyl, displacement is a serious issue in the wake of a nuclear catastrophe. The inhabitants of the Marshall Islands became nomads, "disconnected from their lands and their cultural and indigenous way of life." The tsunami, earthquake, and Fukushima Dai-ichi nuclear disaster destroyed 90 percent of homes in the small town of Futaba.22 The government evacuated residents living within 20 km of the nuclear power plant, resulting in the displacement of 77,000 people.23 Many people continue to live in temporary shelters and residences, uncertain if they would ever be able to return home.24 In October 2012, the International Federation of Red Cross and Red Crescent Societies (IFRC) declared the Fukushima nuclear disaster to be an ongoing humanitarian crisis.25

Between countries, it has been documented that disaster-related deaths occur disproportionately in countries with low and medium levels of development.26 The final report of the World Conference on Disaster Reduction noted that

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disasters in developing countries are compounded by increasing vulnerabilities related to changing demographics; technological and socio-economic conditions; unplanned urbanization; development within high-risk zones; under-development; deprivation; climatic events; climate variability and climate change; geological hazards; competition for scarce resources; and the impact of epidemics such as HIV/AIDS. The report warns that this indicates a future in which disasters could “increasingly threaten” sustainable development of developing countries.25

Effects on specific MDGs

MDG 1: Eradicate extreme poverty and hunger

The effects of a nuclear weapon explosion on poverty and hunger would come directly from loss of human life; damage to housing and infrastructure; and the destruction of food and livestock resources.26 In addition, farming, fishing, hunting, and food gathering activities would be devastated by the long-term effects of radiation. In the case of the meltdown at the Chernobyl nuclear power plant, the impact on agriculture was particularly severe. “Even where farming was still safe, stigma on produce from affected areas led to closure of markets for foodstuffs and produce from those areas.”27 The same was true of the Fukushima Dai-ichi disaster.

As demonstrated in the chapter on famine in this study, the use of nuclear weapons in a regional conflict would have significant effects on the climate, which would result in a decline in global agricultural output. This would be exacerbated by increases in food prices, making food inaccessible for hundreds of millions of the world’s poorest populations. It would also increase malnutrition levels globally, and could result in panic and hoarding on an international level.

MDG 2: Achieve universal primary education

Disasters affect education because of the loss of life of students, their families, and educators; damage to schools and other related infrastructure; and disruption of classes. After a disaster, attending school is often lower on a family’s list of priorities than rebuilding their lives. Some families are forced to migrate, which disrupts continuity in or access to education.28

In the wake of the March 2011 disaster at the Fukushima Dai-ichi Nuclear Power Station in Japan, the government undertook measures to decontaminate schools in Fukushima prefecture. However, Greenpeace argued the steps were “delayed and inadequate.” A study by Greenpeace in August 2011 found that in samples from three schools outside of the 20km exclusion zone, average dose rates of radiation were above the maximum allowed under international standards; 1 millirem per hour, or 0.11 microsievert per hour. Japan’s education ministry established a looser standard, allowing up to 1 microsievert per hour of radiation in schools. While the government assured parents that their children were safe, many parents were not convinced.29 When schools reopened, some more than a year after the disaster, attendance was typically low either because the school settings were substandard, and that the hazardous waste container is substandard, and that the hazardous waste container was not properly disposed of.30

MDG 3: Promote gender equality and empower women

Gender-disaggregated data on the impacts of disasters is not often available, which makes it difficult to study this aspect of development in relation to disasters. However, case studies suggest that women suffer disproportionately in disasters and that their specific needs are usually ignored during relief and rehabilitation initiatives.31 Studies of the 2010 floods in Pakistan demonstrate that women were often overlooked in the distribution of relief and/or were unable to reach places where relief was being distributed due to social norms that restricted their mobility. Women usually take on the bulk of the post-disaster work of caring for the sick due to socially prescribed roles for women as primary caregivers. Dropout rates for girls in school typically increase and violence against women soar under the stress in post-disaster environments. There are also indicators demonstrating that many women and girls are trafficked or driven to prostitution after disasters.32

Health impacts unique to women may also be overlooked in the wake of a disaster. In 2012 the UN Special Rapporteur on the implications for human rights of the environmentally sound management of hazardous substances and waste visited the Marshall Islands to assess the impact on human rights of the nuclear testing conducted in there by the United States from 1946 to 1958. He found that the full effects of radiation on Marshallse women may have been underestimated. Among other things, the bathing and eating habits of women potentially played a role in their higher rates of contamination. The Special Rapporteur found that women often bathed in contaminated water, which may have been overlooked as a possible means of exposure, as was the fact that women eat different parts of fish than men, such as bones and organ meat, in which certain radioactive isotopes tend to accumulate. The Special Rapporteur also notes, “Apparently, women were more exposed to radiation levels in coconut and other foods owing to their role in processing foods and wearing fiber to make sitting and sleeping mats, and handling materials used in housing construction, water collection, hygiene and food preparation, as well as in handicrafts.”33

MDG 4: Reduce child mortality

Children face increased vulnerability in post-disaster situations. This is further exacerbated if the adult(s) they depend on for their well-being and survival are killed or go missing in the disaster. In addition, disasters result in increased limitations to accessing, developing, or sustaining support mechanisms that can provide necessary psychological, educational, protection and legal needs of children affected by disasters.34

A nuclear weapon explosion affects children in unique ways. In his report on nuclear testing in the Marshall Islands, the Special Rapporteur noted a high incidence of thyroid cancer in Marshallse children, due to the intake of iodine-131. This occurs “particularly through drinking milk contaminated with iodine, an element that accumulates in the thyroid, thereby inhibiting growth and the child’s cognitive abilities, which could lead to mental disability.”35 Similar effects have been recorded in children in other irradiated environments, such as regions of Ukraine, Russia, and Belarus in the aftermath of the Chernobyl disaster.36

MDG 5: Improve maternal health

Pregnant women and young mothers are also highly vulnerable in disaster contexts. There is a higher risk of low-weight births and infant deaths in disaster conditions, which can make delivering babies difficult and potentially life-threatening for the mother. Due to the destruction of crops, household food stocks, and livelihoods during a disaster, infants and pregnant and lactating women are increasingly vulnerable to malnutrition.37

In terms of effects from a nuclear explosion, studies on women’s health in the aftermath of the Hiroshima and Nagasaki bombings, nuclear testing in Marshall Islands and in Kazakhstan, and the Chernobyl disaster provide incomplete analyses of ways in which women are uniquely impacted by nuclear radioactivity. In particular, high rates of stillbirths, miscarriages, congenital birth defects, and reproductive problems (such as changes in menstrual cycles and the subsequent inability to conceive) have been recorded.38

As discussed in the chapter on preparedness for dealing with the consequences of nuclear weapon use, the International Committee of the Red Cross has stated, “There is no effective international plan in place to assist the victims of nuclear weapons. The likely destruction of health infrastructure and the spread of death and injury of health-care professionals in areas affected would increase human suffering exponentially.”39

MDG 6: Combat HIV/AIDS, malaria, and other diseases

The effects of disasters on combating diseases vary greatly depending on location or type of disaster, but in general can cause damage to hospitals and medical infrastructure while creating conditions ripe for the spread of epidemics such as malaria, dengue, or diarrheal. HIV infection rates are observed to increase in the wake of a disaster, as men that migrate in search of work from disaster areas and are more likely to indulge in “high risk” sexual behaviour while poverty resulting from the disaster may force more women to engage in sex work.40

Women are uniquely impacted by nuclear radioactivity. In particular, high rates of stillbirths, miscarriages, congenital birth defects, and reproductive problems (such as changes in menstrual cycles and the subsequent inability to conceive) have been recorded.41

The effects of radiation on the human population are further exacerbated by “near irreversible environmental contamination, leading to the loss of livelihoods and lands.”42 Decontamination and storage of radioactive materials following the use of a nuclear weapon is a complex, expensive, lengthy, and hazardous process. Nor are such processes necessarily successful. For example, the Special Rapporteur to the Marshall Islands expressed concern about a radioactive dump site on Runit Island; he was informed that “the structural integrity of the nuclear waste container is substandard, and that the radioactive material contained could seep and leach into the marine and terrestrial environment.”43

The radioactive fallout from the Chernobyl disaster contaminated large areas of Ukraine, Belarus, and Russia, “affecting life in rural communities for decades

Impact on economy and development

Unspeakable suffering – the humanitarian impact of nuclear weapons 63
MDG 8: Develop a global partnership for development

As noted above, in the wake of disasters, humanitarian aid is typically not increased but is rather shifted from regular development budgets, undermining the sustainability of global aid for development. Furthermore, countries are often obligated to repay aid granted in times of disasters. Indonesia, Sri Lanka, Thailand, and the Maldives are currently paying US$2.3 billion per year to donor countries and international financial institutions in debt repayment for tsunami relief. In the case of the use of a nuclear weapon, it is conceivable that the country targeted would not receive international aid, or if it did, would be required to pay it back. The cost of doing so could be crippling to national and local economies. In the case of a nuclear war with devastating regional and/or global effects, it would likely be highly unlikely for emergency aid to even be dispensed in a timely fashion if at all, as many countries would be struggling to deal with the various effects of the war. Furthermore, as noted above, a global economic recession would likely occur in the event of a nuclear exchange, which would dampen or eradicate economic growth in developing countries and interrupt rich countries’ commitments to providing development aid.

Conclusion

This brief overview of the effects of disasters on poverty, hunger, and other aspects of development highlights that the humanitarian consequences of the use of nuclear weapons would have a particularly devastating impact on poor and vulnerable communities in both the immediate aftermath and of the long-term. More comprehensive and scientific research would be necessary in order to determine what the specific effects of the use of nuclear weapons would be on development. However, this initial investigation illustrates that consequences would undermine efforts to achieve the MDGs and result in increased poverty, hunger, and mortality rates in developing countries.

The inadequacy of current mainstream development models coupled with the constant threat of the use of nuclear weapons derived from their very existence demands the reorganization and revitalization of both development and disarmament agendas. Nuclear disarmament should serve as the leading edge of global democratization and redirection of resources to meet human needs and ensure environmental sustainability through an agenda in which development strategies are based on principles of economic justice and equity.