ILPI

Health and environmental effects

The health and environmental effects of the production, testing, and use of nuclear weapons

Background

- The production, testing, and use of nuclear weapons can affect the social and natural world in a wide range of ways
- Usually associated with the Cold War, but several states continue to produce and stockpile nuclear warheads
- The military utility of nuclear weapons is increasingly open to question, yet **17,000 nuclear warheads** are believed to exist
- Nearly 93% of these weapons are in the hands of the US & Russia
- Remaining warheads controlled by France, the UK, China, Pakistan, India, Israel & North Korea
- Between 150 – 240 US nuclear weapons believed to be stationed in Italy, Turkey, Germany, Belgium and the Netherlands

Radiation & materials

- Explosive components of nuclear weapons are made either from **uranium or plutonium**, both radioactive elements
- Plutonium is artificially created, while uranium is a naturally occurring chemical element
- Uranium used in nuclear weapons is enriched, meaning that the composition of uranium-235 has been increased through so-called isotope separation
- Radioactive waste emits ionizing radiation through the process of radioactive decay, and is **hazardous** to the environment and most forms of life
- Exposure to high levels of radiation can cause acute radiation syndrome

Health consequences

- Uranium is a natural element that is mined all over the world
- Australia, Canada, Kazakhstan, Niger, Namibia, Russia and Mali are some of the biggest extractors
- Many uranium mines have been abandoned in recent decades, but **few have been fully cleaned up**
- Abandoned mines pose a risk of contaminating surrounding areas, and the clean-up process itself produces radioactive materials
- Workers at nuclear production facilities are the most at risk, but if dangerous materials are released into the air or soil, the public may also be affected

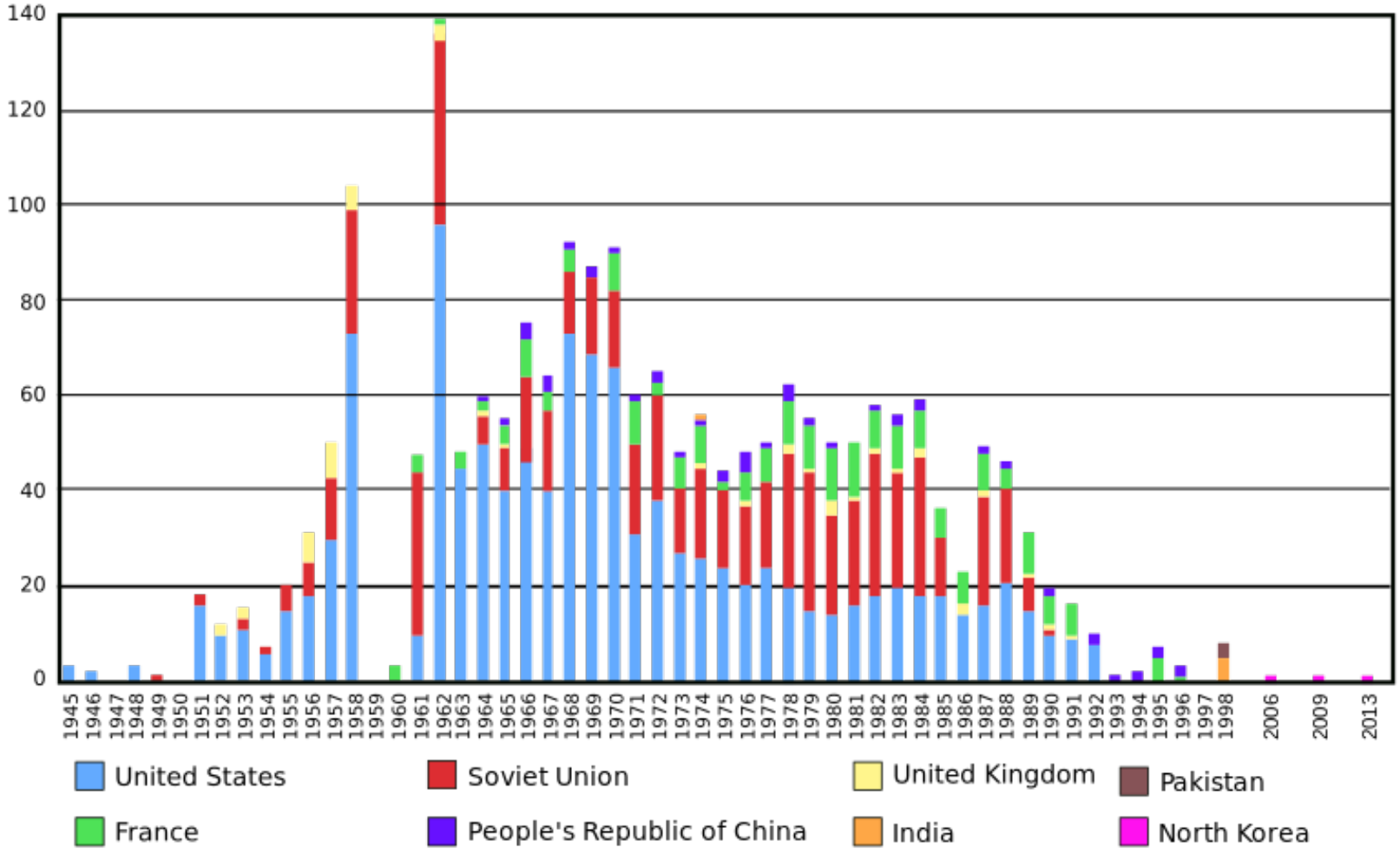
Environmental consequences

- Radioactive and/or toxin substances can escape into the soil or atmosphere through human error, careless practices, or simply bad luck
- High financial costs associated with cleaning up nuclear facilities and decommissioning nuclear warheads has resulted in irresponsible handling of nuclear waste
- Murmansk, Russia: submarines stacked with nuclear warheads permanently anchored – at **great risk** to the surrounding area
- Decommissioned nuclear bombs also put to pacific use through the exploitation of their energy for civilian power

Testing nuclear weapons

- In total **more than 2,000** nuclear weapon tests have been conducted around the world since 1945
- Tests have **gravely affected** human health, the climate and local ecosystems
- Test-explosions in the atmosphere and on the surface caused large amounts of radioactive carbon to be blasted into the air – much returned as radioactive fallout
- Before signing the Partial Test Ban Treaty (PTBT), fallout from Soviet nuclear tests spread to neighbouring countries
- The Comprehensive Test Ban Treaty (CTBT) has not yet entered into force, due to the failure of key states to ratify (including the US, China, Israel, India and Pakistan)

Worldwide nuclear testing, 1945 - 2013



Testing & health

- Ionizing radiation is one of the few scientifically proven carcinogens in human beings
- US studies show how the risk of developing cancer is the greatest for children, more likely to drink contaminated milk
- Airborne radioactive debris has potentially **increased the risk** of cancer and miscarriage many places
- Unborn babies are more at risk than adults, because of the more rapidly diving cells in developing organs and tissue

Remains of the Nagasaki Medical College

Environment & testing

- The radiation spike resulting from atmospheric tests during the Cold War is easily observed in nature
- Atmospheric testing resulted in large amounts of soot being launched into the air – reflects sunlight, causing **a cooling effect** on the global climate
- The radioactive debris produced by surface tests decades ago still persist in the upper atmosphere
- The debris can be shifted around in the atmosphere by natural events – e.g. volcanic eruptions – and eventually return to the ground as rain
- Atmospheric states is no longer as much of a concern, but certain states continue to test nuclear weapons underground

Consequences of use

- The immediate blast from detonation would **kill people within a large area**, causing burn-injuries and blindness
- Severe risks would be associated with the shock wave, falling buildings, shattered glass and other potentially lethal flying objects
- Radiation exposure lowers individuals' resistance to infection, **increasing the risk of disease** and magnifying the harmful impact of any injuries sustained as a result of the blast
- The ozone layer could be severely damaged, global temperatures drop, and the production of vital staple crops be seriously hampered – ***'nuclear winter'***

Summary of the consequences of the production, storage, testing, and use of nuclear weapons

	HEALTH CONSEQUENCES	ENVIRONMENTAL AND CLIMATIC CONSEQUENCES
PRODUCTION AND STORAGE	• Workers at production plants and clean-up sites at risk of exposure to hazardous toxins and radiation. Possible development of cancer and other disease. • Hazard of contamination of drinking water and crops. • Risk of accidents resulting from human or machine error.	• Risk of ecosystem disruption from leakages, and damage to plants and soil. • Risk of water contamination. • Risk of fumes and gasses entering the atmosphere.
TESTING	• Increased global and local risk of cancer of the brain, bladder, leukaemia, thyroid, and other disease from fallout and radioactive debris. • Miscarriage.	• Reduced global temperatures from surface tests. • Damage to the ozone layer from surface tests. • Damage to ecosystems, crops, plants, and wildlife from surface testing. • Risk of underground leakages from underground tests.
USE IN POPULATED AREAS	• Lethal immediate blast, thermal radiation, and long term nuclear radiation. • Increased risk of cancer and lower resistance to infection.	• Risk of 'nuclear winter' – a significant drop in global temperatures. • Damage or destruction of the ozone layer, soil, plants, and animals.