

LEARN ABOUT NUCLEAR WEAPONS

At a conference at the Royal Society of Medicine in London in October 2007, new data was presented regarding the catastrophic consequences of nuclear weapons use. Even a relatively limited use of nuclear weapons, both in the size of nuclear devices and in the geographical area involved, could affect the environment and the climate to an extent previously unknown. If the data from these estimates and simulations are correct, today's nuclear situation with the risk of continued nuclear proliferation must be seen as an even more acute problem. It becomes obvious that nuclear disarmament is in the interest of every state on the globe – nuclear or non-nuclear.

Climate effects of a limited, regional use of nuclear weapons

In the 1980's the term nuclear winter was common in the security debate. The term referred to the darkness and the reduced temperature that would result from a major nuclear war between the US and the Soviet Union. Already then, knowledge was widespread about the massive fires caused by a large scale nuclear war that would create sunlight-blocking soot in the atmosphere and thereby cause darkness, cooling, poor harvests and global famine.

According to Robock¹, climate research has progressed immensely during the last decades, partly due to an increased climate debate. As have the technical possibilities to do detailed computer simulations of complicated climatological processes. Experiences of the climate effects of major forest fires and volcanic eruptions have also brought important knowledge.

The data presented by Robock is based on simulations of a scenario involving two states with large urban centres, which during a limited time detonate a total of 100 Hiroshima-sized nuclear devices in urban areas. The scenario corresponds to what could happen in an armed conflict between India and Pakistan. It is, however, interesting to note that these two states possess less than 0,1 percent of the world's total nuclear arsenals.²

After a nuclear explosion, a large portion of the soot particles will transfer to the stratosphere where they will affect climate on earth for a long time. The occurrence of soot in the stratosphere limits the sunrays – and thereby the light and warmth – that reaches earth. The result is a large reduction in temperature: during the first years

about $-1,25^{\circ}\text{C}$ and after ten years $-0,5^{\circ}\text{C}$. The effects on the earth's climate will remain for more than a decade. The largest temperature drops would occur over land, with several degrees' drop in North America and Eurasia.



The first picture shows the earth as seen from space. This picture, that you probably recognise, was taken during a clear day in May 1969 from the spacecraft Apollo 10, heading towards the moon. In the middle of the picture you can see the California Bay and Mexico. Above the earth, a layer of clouds covers most of the US. These clouds produce all the precipitation needed for that year's agriculture.

This is what the same picture could look like if taken after a large-scale nuclear war. Thick clouds of smoke and soot would cover all of the Northern Hemisphere, bringing darkness and cold. The lack of sunlight and a significant temperature drop would lead to poor harvests and lack of food. A global famine would be the result. A large part of the larger land living mammals would die, while insects and animals living in water would have better chances of survival. It cannot be predicted if people anywhere will survive the nuclear winter, but at least human civilisation could be annihilated.



Source: National Resources Defense Council.

Thinning of the ozone layer

Even a limited nuclear war, as shown by recent research, could have catastrophic consequences for the ozone layer, which protects all life on earth from the sun's harmful UV-rays. It is said that 100 Hiroshima sized bombs detonated in an urban environment would make the ozone layer about 20 percent thinner around the globe. The northern latitudes would be most severely affected, with an up to 70 percent increase of the ozone layer during the first five years following a nuclear war. The tropical areas would be least affected.



All the smoke rising into the stratosphere absorbs sun rays and makes the air incredibly hot. This makes the ozone layer grow thinner. When the ozone layer attenuates, more harmful UV-rays from the sun reach earth, harming both human beings and vegetation. Increased UV-radiation can result in skin cancer, eye problems and other health problems for humans. It also affects the ecosystem in waters, harming fish, shellfish, amphibians and plankton.³

Agricultural issues and starvation

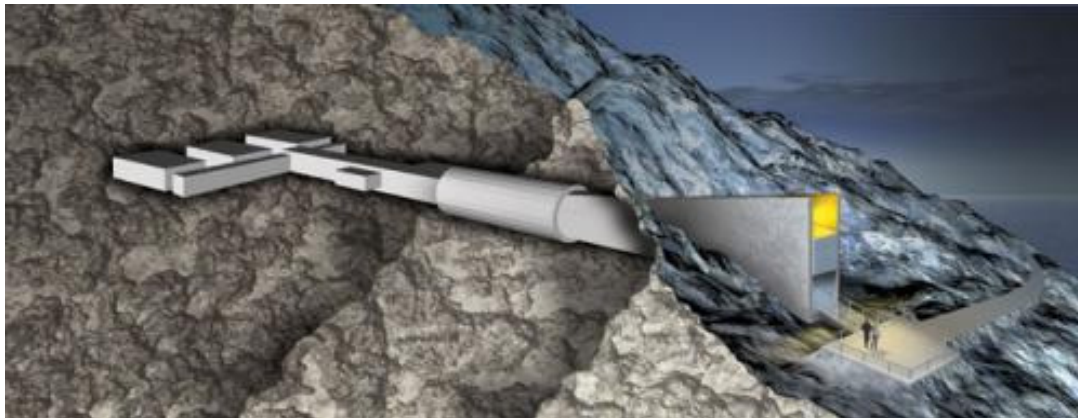
Farming and agriculture would be affected by a change in many climatological factors: precipitation, temperature and sunlight. In a report on the climate effects of regional nuclear war, author Robock estimates that the agricultural season, i.e. the number of days free from frost in one year, would decrease by ten in Sweden and other northern states during the first year following a limited nuclear war between India and Pakistan. The worst part of the scenario is that the bad harvest is described as a global phenomenon. The number of days free from frost during the first year following a nuclear war vary between 10 and 30 (with a Siberian top note of a 100 days lost).

A 10-30 days shortening of the agricultural season due to a temperature drop would result in a drastic cut of the production rate and reduced availability of food worldwide. The world's total grain supply as of August 2007 is estimated at 322 million tons. With an annual consumption of 2098 million tons, this equals 49 days need of grain in store. Almost 11 percent (220 million tons) of the world's grain production is subject to international trade, making the supply politically sensitive. 800 million human beings worldwide have access to a lower daily energy intake than they need.⁴ A drastic decrease in agricultural produce would risk making the situation even harder for those already living below their energy needs.

It is also important to note that starvation to the extent described above would increase the risk of riots, civil wars and escalation of ongoing conflicts over scarce resources, inevitably leading to more death.⁵ A nuclear war, even a limited use of nuclear weapons between for example India and Pakistan, would lead to far more devastating consequences than the immediate effects of the nuclear explosion itself.

The doomsday vault

In February 2008, an international seed vault was opened in Svalbard in the northernmost part of Norway. Drilled more than 100 meters into the mountain, with a constant temperature of -18 degrees C, the vault has been referred to as the Doomsday Vault. The idea is that seeds for all the world's crops would be kept in the vault, safe from natural disasters, climate change and nuclear war.



Picture: an outline of the Svalbard Domsday vault.

Source: <http://www.belowtheclouds.com/2008/02/27/svalbards-globala-frolager/>

Water related problems

A nuclear war would also mean that large parts of water systems in the affected areas would be destroyed. All open water sources would be contaminated by radioactive fallout, making it potentially lethal to drink. After the Chernobyl disaster it became clear that not only water sources and ground water in the immediate surroundings of the disaster zone were affected. Radioactive Cesium from the Chernobyl fallout could still be identified in the oceans in Northern Europe ten years after the accident. Radioactive particles in the water risk contaminating fish and shellfish in these areas.⁶

Those surviving a nuclear attack must be aware of the fact that radioactive particles cannot be boiled or purified by chemical methods. The safest action would be to find drinking water from preferably covered wells as far away from the epicenter as possible. Yet, the author of the book *Nuclear Survival Skills*, Cresson H. Kearny, claims that more people would be killed by water borne diseases than by water contaminated by radioactive fallout.⁷ A nuclear war will also make it harder for people to take care of their hygiene. The water will be polluted, people will live in close quarters and it will be hard to find effective waste management systems. Insects and micro organisms with strong resistance to radioactivity will increase in numbers. Bad hygiene and many insects will lead to a rise in contagious disease – many of which are water borne.

1 Robock, A et al, “*Climatic consequences of regional nuclear conflicts*” Atmos. Chem. Phys.,7, 2003-2012, 2007. Copernicus GmbH on behalf of the European Geosciences Union.

2 Mills, Michael J, Toon, Owen B, Turco, Richard P, Kinnison, Douglas E, Garcia, Rolando R, *Massive global ozone loss predicted following regional nuclear conflict*. University of Colorado 2008.

3 Ibid

4 Helfand, Ira. *An assessment of the extent of projected global famine resulting from limited, regional nuclear war*. © 2007 Royal Society of Medicine

5 Ibid

6 Vattenportalen http://www.vattenportalen.se/fov_problem_radioaktivitet.htm

7 Kearney, Cresson H. *Nuclear Survival Skills*. Oregon Institute of Science and Medicine, 1987. Chapter 8.