

Nuclear Weapons of Mass Destruction and Their Impact on Human and Environment

Zainab Murtaza,¹ Dr. Mian Muhammad Azhar,² and Dr. Khadija Murtaza³

Article Information	Abstract
Received: February 09, 2021 Revised: December 25, 2023 Accepted: December 30, 2023	This paper provides the natural consequences of the creation of weapons of mass destruction (WMD), especially nuclear weapons, creating a huge gap in existing non-proliferation systems and security thinking. Nuclear weapons are being recognized in various parts of the global network as being used for security purposes. In reality, nuclear weapons produce the same air blast effects as conventional explosive weapons. It can directly damage a person's eardrums and can also affect the lungs. Natural deprivation is a worldwide phenomenon that affects human populations, nearby and national security. Nature conservation is at the same time a security and human rights issue as well as an issue of climate change. Radionuclides are examples of chemicals involved in WMD, but beyond these there is a wide range of nuclear radiation and other byproducts, gaseous emissions, and developing solutions for photography. The main sub-sectors of environmental protection are the creation of WMD, and for the most part military projects. The local and international impacts of industries are particularly numerous.
Keywords <i>Nuclear Weapons</i> <i>Environment</i> <i>Carbon Emission</i> <i>fission</i> <i>fusion</i>	

1 Introduction

A weapon of mass destruction is a weapon that can kill and seriously injure countless people and cause extraordinary damage to man-made structures and nature. The United Nations Commission on Conventional Weapons (UNCCA) in August 1948 characterized these weapons as including radiological weapons, nuclear sensitive weapons, lethal dangerous compounds, biological weapons and other types of weapons with dangerous properties developed later. Nuclear bombs have devastating effects. Nuclear weapons are the most dangerous weapons on earth (Carus, 2012). However, trans-border contamination, consumption of assets leading to ethnic or national conflict, and frequent migration, decline in welfare and future, and financial dependence on dirty, waste-extracting or collecting businesses, are among these problems.

¹ PhD Scholar, Department of Political Science, Government College university Faisalabad, Email: zainabmurtaza545@gmail.com

² Corresponding Author, Assistant Professor, Department of Political Science, Government College university Faisalabad, Email: muhammad.azhar@gcuf.edu.pk

³ Visiting Lecturer, Department of Political Science, Government College University Faisalabad, Email: khadijamurtaza12@yahoo.com

Nuclear weapons are gadgets that derive most or all of their striking power from the distribution, combination, or combination of both (Company, 1995). Nuclear division is the splitting of a molecule into at least two parts. Nuclear fusion is the fusion of two atoms to form a single heavy particle. The simplest nuclear weapons are fission weapons. Tests of nuclear devices have gone from yields as low as one kiloton to 50 megatons (National Research Council, 2005).

Nuclear weapons are the most dangerous weapons on earth. One can destroy an entire city, slaughtering and endangering wildlife and people with tragic consequences afterward. Nuclear weapons are the deadliest type of WMD. Nuclear weapons are sometimes called nuclear bombs. Atomic bombs also release radioactive material. This radioactive material can affect people many years after the bomb explodes. Radiation from nuclear bombs can cause birth defects in babies born long after the bomb has exploded.

There have been only two nuclear attacks in history and both of these attacks were carried out by the United States. During the Second World War, it dropped atomic bombs on the urban areas of Japan. These attacks resulted in the involvement of groups of over 200,000 people (Tomonaga, 2019). Many countries that do not have nuclear weapons are trying to acquire them and believe that they may need them later. They feel that these weapons are the only important way they can avoid various countries that have nuclear weapons.

Some have built significantly more powerful nuclear weapons. These weapons are called thermonuclear weapons. An atomic bomb is many times more powerful than a nuclear bomb. Conventional bomb and nuclear bomb explosions are distinguished by rapid fusion reactions while atomic bombs explode through nuclear reactions. Because nuclear reactions produce far more significant steps of life than synthetic reactions, atomic bombs, per unit of matter, are thousands, or even millions, of times more explosive than conventional bombs. In addition to the radioactive fallout from nuclear explosions that are dangerous to all life, nuclear explosions can cause damage long after they occur.

2 Literature Review

The aim of this study is to explore the impacts and risks of nuclear weapons on Human and the environment. There are some books that are useful for understanding nuclear weapons and their effects.

Robinson, in his book describes how humans have destroyed the Earth and its various ecosystems. The book also covers the harmful consequences of developing, testing, stockpiling, and using weapons of mass destruction, both predictable and unintended. The book describes the classification of ecosystems and weapons of mass destruction. The following chapter examines how guns affect ecosystems using environmental survey data from actual weapons testing sites and combat zones (Robinson, 2013).

Westing, in his book explores how war and other military operations lead to this type of degradation. There is little indication that global violence is declining, and the military's ability to destroy and disrupt ecosystems has increased. Each of the major global habitats—temperate, tropical, desert, arctic, insular, and marine—is subject to a separate assessment based on human use and abuse of the same ecosystem (Westing, 1980).

These books help to understand some of the unresolved concerns about how weapons affect ecosystems, encourages additional research to advance the cause of environmental protection and disarmament, and addresses these issues.

3 Material and Methods

To understand the impacts of nuclear weapons this study adopted analytical and descriptive designs. Secondary sources used to obtain data for research include books, journals, newspapers, articles and previous study projects. Qualitative method is used for this research.

4 There are Two Types of Nuclear Weapons

There are two basic methods used for nuclear explosions, they are fission and fusion (Scientists, 2016). They are opposites, when a one atom split it is called fusion and when 2 atoms combine it is called fission. Fission bombs are commonly called atomic bombs and fusion bombs are called thermonuclear or hydrogen bombs.

4.1 Splitting Atom as Fission Weapons

Particles are part of weapons. The core of the weapon is made of plutonium or more advanced uranium. Both molecules are sufficient. Both contain a number of protons and neutrons in their cores. Uranium is usually dispersed in nature in constant mixing with various components. Uranium has sixteen isotopes, but only three are found in characteristic uranium. U-238 is the most abundant by a long shot, making up 99.28 percent of regular uranium. U-235 makes up 0.71% of regular uranium. Uranium-234 constitutes only 0.0058 percent (Science Behind the Atom Bomb, 2014).

Plutonium is present only in the world characterized by: For all intents and purposes, the plutonium that exists today is the result of human activity in the twentieth and twenty-first centuries. 15 isotopes of plutonium are known, although only PU 239 and 241 are fissile. For a variety of reasons, plutonium-239, rather than plutonium-241, is commonly used to create electrical power and nuclear weapons. Both plutonium 240 and 242 are neutron-damaging, which means they absorb neutrons without dissociating them (Burns, 2011). There are two types of fission bombs, two of which were created by the Manhattan Project called the Intended Weapon type bomb and the Implosion bomb.

4.2 Fusion Weapons

Fusion or nuclear bombs are increasingly incredible, powerful and massively more labor-intensive than fission and fission weapons. They likewise consist of thousands of non-nuclear parts such as batteries, capacitors, links, detonators and wires. The main nuclear device weighed more than 60 tons and was much larger than various bombs. While it was 500 times more earth-shattering and powerful than the Maine fission bomb test and 800 times more impactful than the bomb that destroyed Hiroshima. This is the same reaction that occurs in the focal point of the sun. This type can only occur at high temperatures and unusual weights. Regularly these weapons are many times more dangerous than the fragmentation bombs that attacked Hiroshima and Nagasaki. It is also called a two-phase atomic weapon.

5 Brief History of Nuclear Weapons

During World War II, the United States made atomic bombs because it believed that Germany was also working on nuclear weapons. The Manhattan Projects effort was at one time considered the highest priority project among many competing states (Goldberg, 1995). Germany surrendered before the atomic bomb was developed, but the weapon was used on two separate occasions in 1945, three days apart, to force Japan to surrender, ultimately leading to the most devastating war in human history. Since the use of atomic weapons against Hiroshima on August 6 and August 14, they have never been used in war again. The first detonation of nuclear weapons took place on 16 July 1945 in the United States when it first tested an atomic bomb. After just 3 weeks, the world politics changed. The United States dropped an atomic bomb on Hiroshima, Japan on August 6, 1945, killing or injuring about 130,000 people. Three days later, the United States bombed Nagasaki. Of the 28,600 people living there at the time of the explosion, 74,000 were killed and 75,000 were seriously injured. On August 14, 1945, Japan surrendered unconditionally. It also resulted in the end of World War II.

Meanwhile, the nuclear arms race began during the Cold War. During this period, the United States and the Soviet Union conducted thousands of nuclear tests as they developed more advanced and lethal weapon systems. This world changed a lot when America tested the H-bomb in 1952. That bomb was much smaller in size, more powerful and more dangerous than the weapon dropped on Hiroshima. In 1953, the Russians developed the H-bomb, and after this test, the world became more dangerous.

In 1954, Indian President Jawaharlal Nehru said that these weapons are a threat to the world; these should be banned because he advocated a peaceful world. It was the first major move to ban nuclear technology of mass destruction. Later, France established its nuclear program in 1960, while China developed its own nuclear weapon by testing it in 1964.

However, in the 1970s, India conducted its first nuclear test to detonate a nuclear weapon named Smiling Buddha. At that time, India declared it as a peaceful experiment, but after some time, it announced to the world that India is a nuclear power. India shocked the world on May 11, 1998 (1998: India explodes nuclear controversy, 2005) by testing and establishing 3 nuclear weapons which was about 6 times more powerful and dangerous than on the Hiroshima attacked by Americans. After this tests India also tested two more nuclear explosions. Meanwhile, as Pakistan strengthened its nuclear program in response to India's nuclear program, with its six nuclear weapons to maintain its status and balance of power in the region.

Proliferation problems in South Asia are of two types namely vertical and horizontal. Vertical proliferation occurs when nuclear states modernize and advance their nuclear arsenals with more reliable delivery systems and warheads. The US, China, India and Pakistan are in the process of modernizing their weapons. Nuclear proliferation is the spread of nuclear weapons technology from nuclear states to other entities known as horizontal proliferation. This includes nuclear aspiring states and non-state actors such as terrorist groups. In South Asia this type of spread is particularly associated with A.Q. Khan Network and its support to states like North Korea and Iran. While vertical and horizontal diffusion are different forms of diffusion dynamics. In recent years, experts have identified two main causes of South Asia's nuclear problems. India and Pakistan are two major players in the South Asian region.

North Korea also tested a nuclear weapon that was more powerful and dangerous and declared in international politics that it had achieved the status of the eighth nuclear weapon state. North Korea's weapons can target South Korea as well as US, Chinese and Russian territories.

Additionally, Syria received direct support from Russia, and some other nuclear states, to develop its nuclear weapons program. Furthermore, the state's main motivation for acquiring nuclear weapons and biological weapons power was that it felt threatened by Israel, since Israel is a powerful nuclear power.

6 Effects of Nuclear Weapons on Human Health and Environment

The main sub-sectors of environmental protection are the creation of WMD, and for the most part military projects. The local and international impacts of industries are particularly numerous, apart from the actual or potential impacts of their finished products. Examples are radionuclides and chemicals included in WMD, but beyond these are precursor chemicals and nuclear radiation and other byproducts, solid milling and tailings, gaseous emissions, and a variety of prosaic waste such as used filters, gloves, and photographic developing solutions. Military industries involved in the production of conventional weapons produce large amounts of waste, such as previously used defense sites (FUDS), which may be marginally less toxic and persistent than WMD production.

It is important to understand that a nuclear explosion produces many different forms of energy that have their own destructive consequences in order to understand the effect of nuclear weapons.

- i) Blast
- ii) Thermal Radiation
- iii) Electromagnetic pulse
- iv) Nuclear Fallout
- v) Effects of Radiation on Humans

6.1 Blast

Due to the high temperature and weight of this weapon, the vapor deposits of the explosion are transferred to the outside. The effect of these high weights makes traveling several times faster than the speed of sound at 800 km/h dangerous. If the structure can be destroyed, there will be essentially no living things left. There will be a lot of scope and few casualties. In any nuclear collision, all things considered, this environmental devastation would cause far more casualties than the immediate effects of a nuclear explosion.

6.2 Thermal Radiation

Thermal radiation incorporates heat and light. A lot of infrared, clear and bright beams are also produced in the first few moments from the outside of the fireball. This thermal radiation travels outwards at the speed of light. It therefore exceeds the substantial number of impacts in a nuclear explosion by a large margin, and also at separations where impact effects appear. The range of thermal effects increases markedly with weapon production. Larger nuclear warheads can burn far beyond separation and cause other thermal damage that they can cause impact damage. It is the increased effects of these volcanic storms that create stratospheric

smoke layers that cause dangerous worldwide climate change that eventually becomes the inevitable environmental consequence of a nuclear war that would compromise the continued existence of human beings. Meanwhile, the glow from an atomic explosion can be seen from miles away.

6.3 Electromagnetic Pulse

This heartbeat is abnormally felt at very high separations. A single high-return atomic detonation will create a dangerous EMP over a large number of square kilometres below the detonation site. Despite its various effects, an atom transmits an electromagnetic heartbeat like a warm heartbeat. Despite the fact that part of the electromagnetic pulse does not immediately harm people, it can create havoc at the site of a nuclear explosion as it damages every single electrical device. War planners consider the EMP from a high-return rocket detonation suitable for disrupting all of their country's correspondence arrangements, and sending a solitary rocket over these lines could start a nuclear war.

6.4 Radioactive Fallout

This may be the most heinous effect of a nuclear explosion in light of the fact that the aftershock zone is much wider and more highly irregular than direct nuclear radiation. Removing it is a very important and important activity. The radiation produced at the time of the explosion is known as the schedule or initial radiation, and it occurs within the initial moment of the explosion. Anyone close enough to the explosion to be hit by the radiation in time will likely be killed by the impact and heat effects.

6.5 Radiation of Weapons of Mass Destruction Effects on Humans Life

The adverse effects of weapon radiation on human life depend on the dose of the weapon emitted. Presentation of radiation and emission is moderate and diffuse or profuse and immediate. Radiation affects cells in the human body that are effectively isolated, for example, found in hair, bone marrow, and hypothalamic organs. A large and rapid radiation from a weapon of mass destruction can penetrate cells and cause effects in the human body within hours or days (Ashford, 2011). The most real delayed, long-range effect of radiation exposure is the increased frequency of leukemia and tumors of the thyroid, lung, chest, and bone. For example, uranium miners show a high incidence of fatal lung development from breathing in radioactive residues. Additionally, it is the reason for the extremely high rate of leukemia among survivors of the 1945 bombing of Hiroshima.

A number of researchers and experts say the dangers of radiation released during each stage of nuclear weapons creation and inevitable explosion. A variety of genetic defects, desensitization, disease, stillbirth, mental retardation and severe medical problems have been observed due to atomic radiation.

There are also long term effects of nuclear radiation which create physical problems.

6.6 Blood Disorders

As the Japanese data show, people exposed to the bomb had increased vulnerability. Sometimes, the reduction in white and red platelets continued for up to ten years after the bombing.

6.7 Tumors

Nuclear radiation is known to cause cancer, yet some tumor types develop more quickly than others. A broad type is leukemia. The incidence of disease among Hiroshima and Nagasaki survivors is greater than each, and a significant correlation between presentation level and rate level is found for thyroid dysfunction, chest and malignancy and salivary organ dysfunction. Often 10 years or more go by before radiation damage becomes apparent.

6.8 Effects of Radiation on Environment

Due to nuclear radiation, the temperature of the atmosphere is becoming alarming day by day. While a thick layer of smog remains in the atmosphere which spoils the sun's rays for a long time. Due to this change, agriculture is suffering from extreme heat. Radiation from nuclear weapons contaminates food production.

A nuclear weapon can be many times more lethal than the largest conventional weapon. Radiation and explosive radiation from weapons of mass destruction produce extremely hot trends in temperature, radioactive emissions, high radiation ranges, and electromagnetic pulses. On the other hand, various incredible weapons are dangerous to the ecosystems around the world and it is a major cause of climate change.

Other immediate effects include overpressure injury, collapse of structures and buildings, and heat and fire. Apparently radiation causes radiation sickness with infection and possibly death. Usually in low doses, it weakens the bone marrow. In high doses, the stomach can be damaged and the brain can be severely damaged. The radiations and emission of nuclear explosions are the important cause the enormous fires. Smoke from gas and oil refineries, chemical production plants and industrial facilities will be toxic to nature and humans. The effects of these emissions and chemicals will be devastating to life on Earth. More than four hundred thousand people die each year as a direct result of carbon-induced climate change.

A nuclear arms race could lead to severe global famine and climate change. Nuclear weapons destroy the environment even when they are not used, causing long-lasting contamination of water and land around the world. In fact, increasing resource scarcity also increases the likelihood of conflict. However in 2012, 122 countries voted to ban these weapons to protect people and the environment (Sanders-Zakre, 2020).

An environmental emergency creates the threat of nuclear war. The Bulletin of the Atomic Scientists' Doomsday Clock, a symbolic clock that measures the risk of total destruction from nuclear war, is currently 2 minutes to midnight, the highest risk since 1947. This is due in large part to three variables:

- i) Insecure political administration in the atomic states,
- ii) Expanded danger of coincidental atomic explosion or cyberterrorism because of the powerlessness of the high and developing dependence on robotized frameworks,
- iii) Environmental change duplicates the potential for strife over assets, for example, land, drinking water and nourishment saves and builds the strain to move. Political breakdown, thus, prompts fanatic pioneers dealing with atomic weapons, which represents a hazard in locales where there as of now is political pressure. The impact of the local and international industries is particularly countless, aside from the real or potential impact of their finished products.

However, three conferences on the humanitarian effects of nuclear weapons, held in 2013 and 2014, showed that there are several major factors that increase the likelihood of a nuclear weapon being detonated, even if it is accidental, an error in judgment (Wan, 2020).

- i) Capability Hacking and Human Error of Command and Control Networks for Nuclear Weapons
- ii) Keeping nuclear arsenals on high alert, thousands of missiles are ready to launch within minutes.
- iii) Risks associated with access by non-state actors to nuclear weapons and related materials.

7 Conclusion

From the beginning of the development of nuclear technology, it has been clear that there is a close relationship between the military and civilian uses of nuclear power. Nevertheless, there has been considerable debate regarding the use of nuclear energy and related technologies, with two major issues being the disposal of radioactive waste and the effects of nuclear accidents on the environment. Scientists and anti-nuclear activists have warned of the dangers of radiation released during each stage of nuclear weapons development and its eventual detonation. The solutions to climate change must include nuclear demobilization. Nuclear weapons speak to an unsatisfying cost and opportunity and sabotage the institutions of universal cooperation and altruism fundamental to addressing global emergencies. To mitigate the environmental emergency, a robust assembly of assets is required. A large chunk of this capital project can be derived legally from critical assets that will be decommissioned once denuclearized. At the same time, the logistical capacity and political assets now associated with nuclear weapons could then be diverted to the pursuit of biological development. Then again, the response to both an environmental emergency and a nuclear weapon must essentially involve a worldwide network. It is fundamental to encourage a culture of harmony and advance humanity's efforts towards strengthening the multilateral system. Nuclear disarmament is a hot topic in many international conventions. It refers to the process of reducing or eliminating the use of nuclear weapons. While the Nuclear Non-Proliferation Treaty or NPT is also an international agreement aimed at preventing the spread of nuclear weapons and weapons technology and promoting cooperation in the peaceful uses of nuclear energy. Many countries spend billions of dollars each year on developing, maintaining, and protecting their nuclear weapons. This cash could be better focused on using nuclear power for non-military applications, for example, medical services and training. Similarly, the possible use of nuclear explosives in the propulsion framework for space travel is also being explored.

Last but not least, states are accepting the recklessness of these weapons of mass destruction. There is needed to make rules about these weapons set in stone, with no exceptions. The more we let these things slip through the cracks, the more we hold our breath for someone to pull the trigger and plunge our world into darkness.

References

- Ashford, M. (2011, March 16). *FYI: How Does Nuclear Radiation Do Its Damage?* Retrieved from Poplar Science: <https://www.popsci.com/science/article/2011-03/fyi-how-does-nuclear-radiation-do-its-damage/>

- Burns, C. (2011). Overview of Plutonium and Its Health Effects.
- Carus, W. S. (2012). Defining Weapons of Mass Destruction. *Center for the Study of Weapons of Mass Destruction*.
- Company, D. P. (1995). *Closing the Circle on the Splitting of the Atom*. Washington D.C: DIANE Publishing .
- Goldberg, S. (1995). *Atomic Bomb Research and The Beginnings of High Energy Physics*. Retrieved from History of Science Society.org: <https://hssonline.org/resources/atomic-bomb-research-and-the-beginnings-of-high-energy-physics/>
- National Research Council, D. o.-P. (2005). *Effects of Nuclear Earth-Penetrator and Other Weapons*. Washington D.C: National Academies Press.
- Robinson, J. P. (2013). *The Effects of Weapons on Ecosystems*. New York: Elsevier Science.
- Sanders-Zakre, A. (2020, January 16). *Nuclear weapons worsen the climate crisis*. Retrieved from the guardian: <https://www.theguardian.com/world/2020/jan/16/nuclear-weapons-worsen-the-climate-crisis>
- Scientists, U. o. (2016, September 29). *How do nuclear weapons work?* Retrieved from Union of Concerned Scientists: <https://www.ucsusa.org/resources/how-nuclear-weapons-work>.
- Tomonaga, M. (2019). The Atomic Bombings of Hiroshima and Nagasaki: A Summary of the Human Consequences, 1945-2018, and Lessons for Homo sapiens to End the Nuclear Weapon Age. *Journal for Peace and Nuclear Disarmament*.
- Wan, W. (2020). *Nuclear Risk Reduction: Closing Pathways to Use*. Geneva: UNIDIR.
- Westing, A. H. (1980). *Warfare in a Fragile World*. London: Taylor & Francis.
- 1998: *India explodes nuclear controversy*. (2005, May 11). Retrieved from BBC: http://news.bbc.co.uk/onthisday/hi/dates/stories/may/11/newsid_3664000/3664259.stm
- Science Behind the Atom Bomb*. (2014, June 5). Retrieved from Atomic heritage foundation: <https://www.atomicheritage.org/history/science-behind-atom-bomb>