7 Atoms of Discord: Nuclear Proliferation and its impact on Global Security

Rebecca Mondal

Abstract

This paper explores the multifaceted effects of nuclear proliferation on the worldwide security paradigm and the success (or lack thereof) of non-proliferation agreements. It investigates how the spread of nuclear weapons influences international stability, power balances, and conflict probabilities. The study emerges from the concern that existent proliferation treaties are failing to restrain the Nuclear Weapon States (NWS) from using their capabilities and stockpiles as bargaining chips in their continuous efforts at securing new or refashioned regional and international world orders. This leads to the continuous refinement of nuclear materials for weaponisation, jeopardising all concurrent efforts at establishing regional and global well-being and peace. Through a blend of theoretical analysis and case studies, the paper aims to answer the central question: How does nuclear proliferation impact international security and the effectiveness of non-proliferation regimes? The conclusion provides policy recommendations to enhance the efficacy of non-proliferation efforts in a rapidly evolving global landscape.

Keywords

- Nuclear Proliferation
- Proliferation Treaties
- Nuclear Weapon States (NWS)
- Global well-being and peace
- International Security

Understanding Nuclear Proliferation

Nuclear bombs function by nuclear fission, where the nuclei of highly enriched uranium (typically U-235) or plutonium split. Fission weapons work through a cascading reaction, where each fission event releases additional neutrons that initiate further fission processes. A more powerful form of nuclear weapon is the hydrogen bombs,

which relies on nuclear fission, requiring extremely elevated thermal and pressure levels. Fusion weapons are also known as thermonuclear weapons. Nuclear bombs inflict destruction through multiple impacts. Immediate destruction results from a powerful blast combined with thermal radiation, capable of creating a firestorm moving at high speeds with temperatures reaching 1000 degrees Celsius. However, the most lasting and widespread effects stem from nuclear radiation. Detonation releases immediate nuclear radiation and radioactive fallout. Exposure to these radiation sources can lead to radiation sickness and long-term health issues, including various cancers (Heywood, 264). Hydrogen bombs, as a type of nuclear weapon, possess immense destructive capabilities.

Owing to this destructive potential of nuclear weapons, they have been recognised by the United Nations since 1948 as 'weapons of mass destruction' (WMD). This classification now includes chemical and biological weapons (CBW), sometimes clustered as atomic, biological, and chemical weapons (ABC). WMDs differ from conventional warfare in several aspects, they can cause extensive collateral damage, and their widespread influence raises ethical questions regarding the morality of using such inhumane and 'illegitimate' warfare methods. Nuclear proliferation refers to the expansion of nuclear arsenals as well as the broader distribution of nuclear technology and expertise that could potentially be utilised for military purposes. There are two main types of proliferation. Horizontal proliferation relates to the transfer of nuclear weapons among multiple nations, categorized as Non-Nuclear Weapon States (NNWS). On the other hand, vertical proliferation involves the expansion or dispersal of nuclear weapons by Nuclear Weapon States (NWS). The Manhattan Project, under the scientific direction of Robert Oppenheimer, was composed of two atomic bombs that struck Hiroshima and Nagasaki on August 6 and August 9, 1945, respectively. These bombings remain the only instances of nuclear weapons being deployed in combat. With a foundational understanding of what nuclear proliferation entails, I will now examine its profound impact on international security dynamics.

International Security and Nuclear Proliferation

Understanding the complexities of nuclear proliferation requires addressing the motivations behind states' pursuit of nuclear weapons. The atomic bombings carried out by the United States on Japan in 1945 spurred the Soviet Union to hasten its development of nuclear weapons, culminating in its first successful test in 1949. This period marked the elevation of nuclear arms as symbols of geopolitical prestige, with membership in the "nuclear club" becoming synonymous with global power (Heywood, 266). Throughout the Cold War era, this exclusive group expanded to include all five permanent members of the UN Security Council (the P-5), as evidenced by the United Kingdom's nuclear tests in 1952, France's in 1960, and China's in 1962. This is a clear example of deterrence. Deterrence is the ability to prevent a nation from taking actions that threaten one's vital security by showing that such actions would have dire consequences. The nuclear deterrence theory is grounded in political realism. Realists believe that the key factor in preventing nuclear war is not the practical challenges of initiating an attack or ethical beliefs but the anticipation of facing severe consequences in response to one's actions. The main aim of nuclear deterrence is to prevent conflicts by psychologically influencing the mind of an opponent. The development and use of nuclear weapons in 1945 was a significant milestone in warfare and human

history. Soon after, a substantial quantity of nuclear warheads was produced and stored, possessing the ability to inflict immense devastation repeatedly, giving humanity the capability to potentially bring about its annihilation. Some perceived nuclear weapons as vital for maintaining peace among major powers, whereas others regarded the nuclear arms race as a continual cause of conflict and instability.

A contrasting viewpoint to this theory is liberalism intertwined with institutionalism which emphasizes international treaties, diplomacy, transparency among states and the role of international institutions as a medium through which peace could be achieved. During the end of the Cold War, liberalism emerged victorious on a global scale. It fostered a widespread belief in the role of institutions in policy-making to encourage global collaboration and security. It was then that John Mearsheimer critiqued liberal institutionalism by contending that institutionalist theories are erroneous and have a limited impact on state actions (Mohammed, 195). Additionally, he claimed that the promise to promote cooperation and stability in a post-Cold War world was baseless. Nevertheless, liberalism managed to solve formidable challenges by the early 1990s. However, a major setback to liberal institutionalism was the 9/11 attack in the USA. This was announced as a 'war of terror' by President Bush. The subsequent war in Iraq and Afghanistan eradicated the prospect of achieving peace on a global scale.

The global scale has always been governed by a sense of fear and uncertainty. This sense of insecurity is heightened by the increased likelihood of nuclear weapons being used. Although there have been several treaties made that attempt to provide a framework to establish a clear nuclear order, the geopolitical foundations of individual nations and their interests primarily determine the established order. Several factors intensify the nuclear competition including historical hostilities, unresolved territorial conflicts, ideological differences, and strategic rivalries for regional supremacy, pushing states to strengthen their nuclear capabilities. This acquisition of nuclear weapons can significantly alter global and regional power dynamics. The potential for nuclear conflict remains a significant threat to global security. Even though direct conflict between nuclear-armed states has been avoided, the risk of escalation in crises persists. Historical incidents like the Cuban Missile Crisis of 1962 highlight how close the world has come to nuclear war due to miscommunication and miscalculation. Concerns in the contemporary context regarding the same include the potential of cyberattacks on nuclear control and command centres, which could lead to accidental launches or unauthorised use of nuclear weapons. The risk of nuclear accidents is a serious concern, given the catastrophic consequences they can entail. Mishandling of nuclear materials, technical failures, and human error can lead to unintended nuclear detonations. One such example is the 1980 Damascus Titan missile explosion in the U.S., where a fuel leak led to an explosion involving a nuclear warhead, underscoring the dangers. Ensuring the security and safety of nuclear arsenals is a priority for all nuclear-armed states, but the complexity and ageing of nuclear systems present ongoing challenges.

The existence of nuclear weapons has a huge impact on conventional military strategies and doctrines. States with nuclear capabilities may adopt more cautious approaches in conventional conflicts to avoid escalation to nuclear use. Nuclear weapons can serve as a

deterrent against large-scale conventional attacks, as adversaries are aware that pushing a nuclear-armed state too far could result in nuclear retaliation. Many nuclear-armed states integrate their nuclear and conventional forces into comprehensive military doctrines. This integration can create complex and potentially destabilising interactions between nuclear and conventional forces. For instance, doctrines that emphasize the early use of nuclear weapons in a conventional conflict to de-escalate the situation (e.g. Russia's escalate to de-escalate strategy) can blur the lines between conventional and nuclear warfare, increasing the risk of nuclear use. The impact on military planning and decision-making is significant, as the potential for nuclear escalation must be factored into all aspects of conventional military operations. Given the profound impact of nuclear proliferation on international security, it becomes crucial to analyse the efforts that have been made to curb this threat through various non-proliferation regimes and agreements.

Non-Proliferation Regimes

The cornerstone of global nuclear nonproliferation efforts is the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). It was ratified by member states in 1968 and came into force in 1970. It posits that Nuclear Weapon States (NWS) are obliged to agree to not support Non-Nuclear Weapon States (NNWS) in developing or acquiring nuclear weapons, while these states are obligated to abstain from such development or/and acquisition (Bunn). To scrutinize the further effectiveness of this treaty, we must first understand the rationale which led nations to implement a nonproliferation policy and maintain adherence (or not) to its principles.

Some argue, from a strategic perspective, that this treaty represents a significant compromise between nuclear-armed states and those without nuclear weapons, aimed at preventing the spread of nuclear arms and advancing towards full nuclear disarmament.

Alternatively, this paper adopts a realist perspective, which sees the NPT as a mechanism for the five nuclear-armed states to preserve their nuclear supremacy. Initially, these powers viewed the proliferation of nuclear weapons among their allies as a means to bolster their influence. However, they later recognised that enabling their allies to obtain nuclear weapons could diminish their control, as those allies might become more autonomous. To prevent this, the NWS employed a combination of incentives and pressure, using both multilateral and bilateral agreements to ensure non-nuclear weapon states adhered to nonproliferation principles. Originally designed to halt the spread of nuclear weapons, the NPT now functions as a system to oversee compliance by the NNWS and monitor instances of non-compliance (Bunn).

This treaty confronts several major challenges, including the continued nuclear activities of countries such as North Korea and Iran, the worldwide revival of nationalism, heightened rivalry among leading nuclear powers, and deepening divisions among NPT member states. One suggested response to addressing this was the establishment of the Comprehensive Test Ban Treaty. It was considered a "litmus test of commitment" to the arms reduction commitments assumed by the NPT nuclear-weapon states (Cirincione). Two reasons for establishing this treaty were, firstly, public anxiety regarding the radioactive

fallout from atmospheric nuclear tests, secondly, it prohibited all types of nuclear explosions, thereby preventing the development of new nuclear weapons and curbing the advancement of existing arsenals.

While the NPT focuses on preventing the proliferation of nuclear weapons, the CTBT strengthens this effort by closing off one of the key avenues for nuclear weapon development- testing. However, despite several attempts, it was not successfully established because, aside from the NWS, the "nuclear threshold" states of India, Israel and Pakistan needed to ratify this treaty for it to become legally binding and successfully come into force. The International Atomic Energy Agency's (IAEA) role is to oversee and monitor the nuclear activities of member countries, ensuring that nuclear materials are limited to peaceful uses (Cirincione). But the "nuclear watchdog" has faced several challenges over the years. In the past, the IAEA primarily carried out inspections at nuclear facilities that countries willingly disclosed for inspection purposes. However, it has been suspected that certain states such as Iran, Iraq and North Korea, conducted uranium enrichment or plutonium separation to develop weapons, in sites not declared open to the IAEA for inspection. Although, uranium enrichment and plutonium separation are allowed under the NPT, if and only if, they are for peaceful purposes and under IAEA inspection. In the 1990s, the IAEA introduced a new technique called "environmental monitoring"- analysing for minute traces of nuclear activity in the air, on surfaces, or in vegetation around a nuclear site, as well as in adjacent bodies of water. Furthermore, the 1997 Additional Protocol allowed the IAEA to inspect sites far from declared nuclear reactors.

Early 1990s, the IAEA advocated for more extensive inspections in North Korea, but Pyongyang declined, resulting in a deadlock. This ultimately resulted in bilateral negotiations between the US and North Korea, where a deal was made that involved North Korea dismantling a reactor suspected of producing plutonium in exchange for new reactors from South Korea and Japan and heavy fuel oil from the US (Davenport). Despite the agreement, North Korea likely continued nuclear weapons activities at other sites after 1994. North Korea withdrew from the NPT in 2003. The reasoning behind this can be the ever-increasing American military presence in East Asia. The US and South Korea carried out joint military exercises featuring the USS Kitty Hawk aircraft carrier, the USS Vincennes Aegis missile cruiser, and amphibious ships. These military resources allowed the US and South Korea to potentially strike North Korea if they chose to. North Korea perceived these actions as direct threats, particularly when the US designated it as part of the "axis of evil" (Davenport).

Iran was among the original signatories of the NPT, which it ratified in 1970, concluding with the Safeguard Agreement with the IAEA which entered into force in 1974. However, in 2002, Iran did not reveal experiments involving plutonium separation and uranium enrichment to the IAEA inspectors which had led to severe tension among states. The core of the nuclear issue lies in Iran's hidden operations and its engagement in the critical elements of the nuclear fuel cycle (Kali). In 2015, China, France, Germany, Russia, the U.K. and the US, collectively known as the P5+1, reached the Joint Comprehensive Plan of Action (JCPOA), commonly referred to as the Iran deal, marking the first concrete attempt by the US and other signatories to curb Iran's nuclear program. Under this plan, Iran was

permitted to possess only 200 kilograms of uranium enriched below 5% until 2031, and its entire nuclear program was under unprecedented oversight by the IAEA (Kali). However, this agreement collapsed after the Trump administration withdrew from it in 2018, despite Iran's full compliance at the time. After waiting a year, Iran began to exceed the restrictions set by the JCPOA and has continued to do so as attempts by the Biden administration, the EU, and others to revive the deal have stalled.

According to a recent report by the IAEA, as of February 2024, Iran has amassed more than 5,000 kg of enriched uranium, of which more than 120 kg were enriched to 60% purity, dangerously close to the weapon's grade (Kali).

Nevertheless, owing to the recent Iran-Israel conflict, it is unclear what Iran's further steps might look like. Many are questioning the justification of enduring economic sanctions without the strategic advantage of nuclear weapons.

Challenges to Non-Proliferation Regimes

One of the major criticisms faced by the Non-Proliferation Regimes is its apparent discriminatory nature. Let's take the US as an example. The 2003 U.S.-led invasion of Iraq, defended on the basis of preventing the development of weapons of mass destruction, exemplifies a unilateral approach that bypassed the multilateral framework of the United Nations, and the ongoing inspections authorized by the Security Council. This action, taken without solid evidence and in defiance of the international community's processes, undermined the credibility of the NPT's inspection regime and set a precedent for prioritising military intervention over diplomatic solutions. Simultaneously, the U.S. Senate's non-ratification of the Comprehensive Nuclear Test Ban Treaty in 1999, followed by the Bush administration's refusal to reconsider the treaty, further weakened the U.S. commitment to global non-proliferation efforts. This refusal contradicts the earlier promises made during the 1995 NPT extension negotiations, where the U.S. agreed to pursue the CTBT as part of the bargain to extend the NPT. Moreover, the administration's push for funding to develop new nuclear weapons, which may require testing, directly opposed the principles of CTBT and signalled a shift away from international arms control commitments (Manseok, Michael). This dual approach–undermining international treaties while pursuing aggressive counter-proliferation strategies–risks eroding the foundations of the global non-proliferation regime. It raises the question of whether the U.S. refusal to join the CTBT could be seen by other nations as a justification for withdrawing from the NPT. If the U.S., a key architect of the non-proliferation framework, selectively disregards its commitments, other states may feel entitled to do the same, potentially leading to a breakdown of the entire regime. The U.S.'s inconsistent approach could inadvertently encourage proliferation rather than contain it.

The political landscape of 2024 can be described as somewhat analogous to the Hobbesian political climate in the state of nature where there is no concept of political authority, the political authority being the international organisation and the treaties and agencies they have set up which are being used as mere puppets in a game of power politics. A game which is constantly being domineered by NWS who keep emphasising the significance of

abiding by non-proliferation regimes but at the same time are reluctant to reduce their arsenals because it might reduce their deterrent capability. Nuclear arms control diplomacy faced several setbacks after Russia invaded Ukraine in 2022. In response to the invasion, the U.S. halted its bilateral strategic stability dialogue with Russia. Additionally, in 2023, Russia announced its suspension from the 2010 New START (Strategic Arms Reduction Treaty), the sole remaining agreement limiting the strategic nuclear forces of both Russia and the U.S. Negotiations for a successor treaty to New START, set to expire in. 2026, were also put on hold.

Iran's military support to Russian forces in Ukraine, coupled with its internal political situation, further complicated efforts to revive the JCPOA. In 2022, both the U.S. and the UK chose not to publicly disclose information about their nuclear arsenals, a departure from their transparency in previous years. As stated in a report published by the Stockholm International Peace Research Institute (SIPRI), NWS increased funding for modernising their atomic arsenal by one-third last year. This can be attributed to the recent wars taking place, further deteriorating international security.

Another pressing challenge to global security is the threat posed by non-state actors, including terrorist organisations within the framework of nuclear terrorism (Berhard, Brill). Unlike state actors, non-state actors are not bound by international treaties like the NPT which creates unique challenges for preventing the acquisition and use of nuclear materials by these groups. While obtaining highly enriched uranium (HEU) or plutonium is difficult, it is not impossible. These materials are stored in various locations worldwide, and while most are under strict scrutiny, the adequacy of measures is concerning, especially in areas with ongoing conflicts or weak governance. The existence of global black markets and proliferation networks such as the A.Q Khan network that facilitated nuclear technology transfers to countries like North Korea and Iran, increases the risk that non-state actors could acquire nuclear materials or knowledge. These networks often work outside the control of any single state, making them difficult to detect and disrupt. While there are international efforts such as the Proliferation Security Initiative (PSI) and the Global Initiative to Combat Nuclear Terrorism (GICNT), these initiatives require coordination among numerous countries and organisations. Gaps in intelligence sharing, differences in legal frameworks, and logistical challenges can hinder these efforts. An added threat is the rapid development and accessibility of technology. The miniaturisation and sophistication of nuclear technology, alongside improved delivery systems like hypersonic missiles, make nuclear weapons more portable, harder to detect, and more difficult to counter, thus heightening proliferation risks. Cybersecurity threats further exacerbate these risks, as cyber-attacks can sabotage nuclear facilities or compromise monitoring systems. Although advancements in surveillance, AI, and detection technologies offer new means to monitor and counter these threats, the continued development of advanced conventional weapons, such as missile defence systems and precision-guided munitions, could provoke further nuclear escalation as states seek to maintain credible deterrents.

Policy Recommendation and Concluding Remarks

Fissile material is a critical factor in nuclear proliferation, which is why most

nonproliferation efforts concentrate on preventing its enrichment. Once the material is secured, constructing a nuclear bomb becomes relatively straightforward (Berhard, Brill). Techniques like explosive lensing are well-known, and even a basic, low-yield bomb–similar to "Little Boy", which was so simple it didn't require testing–could be assembled using standard equipment. Deploying the warhead on a plane or missile isn't essential for deterrence; in fact, in today's world doing so may only place it within the strike range of potential adversaries. Simply testing a nuclear device and allowing the uncertainty to spread can serve as an effective deterrent.

The idea of a Fissile Material Cutoff Treaty (FMCT) has been discussed since 1946, with various proposals and efforts over the decades. Initially proposed by the U.S. in 1956 and supported by the UN in 1993, the FMCT aims to outlaw the production of fissile material for nuclear weapons. Despite several attempts to start negotiations, primarily through the United Nations Conference on Disarmament (CD) and the International Panel on Fissile Materials (IPFM), progress has been repeatedly stalled, notably by Pakistan, with support from China, on procedural grounds. While there have been occasional pushes for the treaty, such as efforts by the Bush and Obama administrations and support from Canada and the EU, no significant process has been made, and negotiations remain at an impasse.

To address the impasse in FMCT negotiations, a policy recommendation could be to initiate a phased, multilateral framework outside of the CD. This framework would involve creating a coalition of willing states, including nuclear and non-nuclear states, to draft an interim agreement focusing on the verification and transparency of existing fissile material stockpiles. By bypassing procedural deadlocks and gradually building trust among key stakeholders, this approach could set the stage for broader international buy-in and eventual comprehensive FMCT negotiations. Additionally, leveraging regional security organisations to support and implement these interim measures could help reduce resistance from key states like Pakistan and China by addressing their specific security concerns within a cooperative regional context.

To conclude, based on the above analysis, it is crucial to move beyond reliance on formal treaties alone. Engaging with state and non-state actors, as well as other influential stakeholders in international relations, is essential to build mutual trust on core principles. A viable approach involves developing a framework for international coalition politics, which can facilitate more flexible and cooperative strategies to manage and mitigate the risks associated with nuclear proliferation. This collaborative framework will enable diverse actors to work together more effectively and adapt to evolving challenges in the global security landscape.

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About the Author

Rebecca Mondal is a Third Year Bachelor of Arts student majoring in Political Science and Philosophy at Sophia College (Autonomous), Mumbai. Her areas of interest include International Politics, Strategic Studies, and Political Philosophy. Rebecca's academic work focuses on understanding the complexities of global political dynamics, military strategies, and foundational political theories. She is keenly interested in exploring how international relations and strategic policies shape the global landscape.