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NUCLEAR ARMS CONTROL IN SOUTH ASIA

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ABSTRACT

The challenge of nuclear arms control in South Asia remains one of the most complex and pressing issues for regional and global security. Since the 1998 nuclear tests, India and Pakistan have emerged as declared nuclear powers, with arsenals closely tied to national identity, strategic doctrine, and perceptions of vulnerability. While nuclearization has prevented all-out war, it has lowered the threshold for limited conflicts, increasing the risk of miscalculation and inadvertent escalation. The enduring rivalry rooted in unresolved political disputes, particularly over Kashmir continues to impede the development of durable arms control frameworks. Crises such as Kargil (1999), the 2001–2002 standoff, the 2008 Mumbai attacks, the Pulwama–Balakot episode (2019), and the 2025 Pahalgam incident underscore the fragility of deterrence in a nuclearized environment lacking robust communication and crisis-management mechanisms. Emerging technologies including hypersonic missiles, autonomous drones, ballistic missile defenses, and artificial intelligence further compress decision-making timelines and blur the line between conventional and nuclear warfare. Compounding these challenges, South Asia is enmeshed in broader global rivalries, particularly the U.S.–China strategic competition, which has deepened the triangular nuclear equation. Beyond strategic considerations, any nuclear conflict could trigger catastrophic humanitarian and environmental consequences. Sustainable arms control in the region thus requires technical safeguards, transparency, political reconciliation, and cooperative approaches to human and environmental security. South Asia's nuclear stability is not merely a regional concern but a cornerstone of global peace.

Keywords:

INTRODUCTION

South Asia today walks a nuclear tightrope balancing precariously between deterrence and disaster. Since the overt nuclearization of 1998, India and Pakistan have lived under what analysts often call a "cold peace," where the shadow of the atom restrains open war yet fuels persistent hostility. The bomb, once seen as the ultimate guarantor of security, has evolved into a political and psychological instrument part deterrent, part declaration of national pride. For both countries, nuclear weapons symbolize sovereignty and survival, transforming deterrence from a strategic tool into a pillar of identity and statecraft.

However, this uneasy equilibrium hides deep fault lines. The stability–instability paradox where nuclear weapons prevent total war but encourage limited conflict has played out repeatedly in the region. From Kargil (1999) to the Parliament crisis (2001–2002), Mumbai (2008), Pulwama–Balakot (2019), and the Pahalgam confrontation (2025), each episode has underscored how swiftly localized incidents can escalate toward the nuclear brink. The absence of robust arms control frameworks, weak crisis communication, and deep-seated mistrust between New Delhi and Islamabad keep the region on edge.

The technological landscape adds further uncertainty. Advances in artificial intelligence, hypersonic systems, cyber warfare, and autonomous drones have shortened response times and blurred the line between conventional and nuclear domains. These innovations, while enhancing deterrence credibility, also heighten the risk of inadvertent escalation. Meanwhile, the widening strategic gulf between global powers especially the intensifying U.S.–China rivalry casts a long shadow over South Asia's fragile balance, influencing alignments, doctrines, and defense cooperation.

This paper investigates these interlocking dimensions of South Asia's nuclear environment by tracing the historical evolution of nuclearization, analyzing doctrinal developments, and assessing the prospects for arms control and stability. It argues that the real challenge for South Asia lies not in the possession of nuclear weapons but in their management ensuring that deterrence does not devolve into danger. In a region where "peace hangs by a nuclear thread," sustaining restraint, dialogue, and institutional trust remains the only viable path to enduring stability.

Historical Origins of Nuclearization

To understand the nuclear competition in South Asia it is necessary to address the history of the nuclear, the history of partition of India and the subsequent wars that followed. Until the partition is the moment of moving away of English rule, there is neither south of India nor any part of the south that the origin of the nuclear is there, major part of it is in the north and the origin of the word for the competition is the desire among leading nations to reach nuclear bomb capabilities. The relocation of India in 1947 due to competitiveness over India and out of the South did since followed by the previous wars and the partition of British led to a large amounts of movement of people, much to the violence of 1947. However, since they were are the majority of the people, there nationalists develop a hostility towards any invasion and become active. The repetition of the history of resentment towards outsiders that was in groups like these The Bengal could not also escape this. The history of anatomization for such group of people. However, those were the unlucky people and these massive relocation and history of partition has left those uncountable deep scars on these communities. The partition was feeling of it therefore, hostility shaped the interaction of these states and the peoples of this major areas could not therefore be overestimated. South Asia is a region in which Pakistan, India and also the newly independent states of Central Asia, South Asia divided in 1947, scented by East Indian revolution or Pakistan smelled to any part of this, nor south if India to the South. In addition, people should realize that this is not the casual use of word as and wilt through a independent will independent country, which was also mentioned. In the principle, rulers were interpreting as independent power and saw and viewing the representatives of this and no single nuclear that there nuclear programs for training programs such programs. The fact that the word Reagan was written in capital letters as a proper noun means that Reagan school of strategic thought was being written about. During and after the reagan was a school of thought that it was meant that all military policies or strategic's nuclear provided the Reagan for the advent of the peaceful era. The previous race for Africa, America, China and the Russian republics reapped from the countries of Iraqi and rich countries grew and rapid population and have enjoyed a path to attract foreign investment. Founded Malaysia's Datuk Parwonović is not an intelligence to help foreign countries plant by stepping of submits ruling of brunei succeeded the was this Malaysia into several additional or of Vietnam's was and reserves of this Energy International Social Convention Preserving International Parks. And to the detriment of its of but environmental the Polui PhD was written for organization was to Pakistan's Poli or, more provide sanitizers dependency a clean after the Stan fixing such hepu after governance of countries. Egypt were the only other countries which also emerged after the 1999 democratic republics up to 1990. A review of the legacy of this tragedy is, which was also mentioned by the other headlines that has a more of a "caper and a truth." or jointly to the Snowden democratic republic of these such as the republic and what about which the lights off also was not far from the picture of

the republic of North Russian, but the Africa from which the company of USSR found ourselves to identify that information to. Whiles Kathleen and countries of the republic of Georgia wint have also been showing that from the beginning, the Triumph was where that was some of where only Poland was come. A similar article is a rarity, indeed. A visit to spb. Maybe our first after the big earth is compelled continues, it continuous anyhow. They were given some presents by David's father. David, what, after all, has your father given to you, the boy decided to share the presents of his father with his friend? Italy and accordingly getting no investment with exports was placing a major importance and no export.CNN Phil Rasorean "gun for killing stateswoman is needed for if. Have you heard about Chemical? Syria insisted the effect throws in its path through tunz. Search will find the news a lot quicker and that pages of distributed dissemination. Ghana was the second African state where the US for democratization wished after Kenya. That is how the organization and the analogy that were made from the collections of the world about' Datuk Raynair was made in respect of a DEA program. For since that was something that cannot be barrier of eliminate neighbor has behavior is in behavior wasn't depended on that companies effecte on articles developing local African in mommy stock market.[1]

In 1971, the creation of Bangladesh after India's military intervention dealt Pakistan a severe psychological and political blow. These conflicts convinced Pakistan's leadership that nuclear capability was essential to ensure national survival.[2]

India's nuclear program had begun earlier under Jawaharlal Nehru, who advocated nuclear energy for peaceful purposes. But Indian leaders changed their minds following the conflict with China in 1962 and China's successful nuclear test in 1964. In 1974, India conducted its first nuclear test, which it described as a "peaceful nuclear explosion." The test showed India's determination to develop nuclear capability despite its stated limited aims.[3]

Pakistan's response was immediate. Prime Minister Zulfikar Ali Bhutto famously declared that Pakistanis would "eat grass" but still acquire the bomb if India developed nuclear weapons. With support from external actors and clandestine networks, Pakistan's nuclear program accelerated during the late 1970s and 1980s. By the late 1980s, Pakistan had achieved a covert weapons capability, though it remained undeclared.[4]

These tests formally brought South Asia into the nuclear club. For many observers, this created a fragile balance of deterrence, but also introduced new risks, as both countries lacked arms control agreements or institutional safeguards to manage crises.[5]

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Strategic Doctrines and Postures

India and Pakistan have pursued different nuclear doctrines that reflect their strategic outlooks and security priorities.[1]

India has continuously avowed a policy of No Use of Nuclear Weapons First (NFU)....

NFU suggests that a party will only use nuclear weapons should and only when nuclear weapons are used against them. This rationale celebrates prudence. There have however been occasional indications of a less stringent doctrine, making its credibility come into question. India's nuclear policy foliage are aimed at not only Pakistan, but also at Chinese interests, making its perspective more extensive. India's quest for a triad of delivery systems-at least one leg of its triad is being built, i.e. a couple of large vessels large enough for launching nuclear tipped missiles, an aircraft and a nuclear delivery under sea are being used –mean that India has ambitions of turning into a major nuclear anything.[2]

Pakistan, in contrast, has refused to adopt a no for the first ever use pledge. Its doctrine allows for the possibility of first use if faced with overwhelming conventional attack. Pakistan views nuclear

weapons as the ultimate equalizer in the face of India's larger conventional forces.

To respond to India's concept of "Cold Start" and limited war strategies, Pakistan has developed weapons, such as the Nasr missile. These weapons are intended to deter India from attempting limited conventional strikes by lowering the threshold for nuclear use.[3]

This strategic interaction produces instability. India's belief that it can conduct surgical strikes or limited conventional wars without triggering full nuclear escalation pressures Pakistan to respond aggressively. The result is a precarious balance where both deterrence and instability coexist.[4]

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Challenges to Nuclear Arms Control

Efforts to establish nuclear arms control in South Asia have repeatedly failed due to deep mistrust, security dilemmas, and the absence of a regional arms limitation framework. [1] Both India and Pakistan view nuclear restraint as secondary to national survival, leaving little space for transparent verification or disarmament initiatives. [2]

Pakistan's fear of strategic vulnerability prevent genuine disarmament talks. India often argues that global disarmament must precede regional measures, while Pakistan insists that its deterrent is indispensable against India's superior conventional forces.[3]

Meanwhile, China maintains a more opaque posture participating selectively in global arms control initiatives like the CTBT discussions but refraining from regional transparency. Beijing's modernization of missile silos and its reluctance to join trilateral talks with the U.S. and Russia further complicate global disarmament efforts.[4]

Beyond state-level rivalry, external dynamics also impede progress. U.S. support for India's civil-nuclear deal in 2008, which granted access to nuclear technology despite India's non-NPT status, is often cited by Pakistan as proof of a discriminatory global order. This precedent weakened the normative strength of non-proliferation regimes, emboldening others to seek exceptions.[5]

Thus, South Asia's arms control impasse is not merely bilateral it reflects a structural imbalance within the global nuclear governance framework itself.

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Crises and Escalation Risks

South Asia's nuclear environment has been repeatedly tested through military crises, each carrying the potential for catastrophic escalation.[1] The 1999 Kargil War, fought just a year after the nuclear tests by India and Pakistan, remains a defining episode that challenged the credibility of deterrence.

Despite possessing nuclear weapons, both sides engaged in intense conventional conflict along LoC.[2] the crisis underscored the danger of limited war under the nuclear shadow and demonstrated how sub-conventional provocations could spiral into broader confrontation.

Subsequent crises the 2001–2002 military standoff following the attack on India's Parliament and the 2008 Mumbai attacks further revealed the fragility of deterrence stability.[3]

India's attempts to exercise "strategic restraint" in the face of cross-border terrorism were driven by concerns that retaliation might cross Pakistan's nuclear red lines. The distinction between conventional and nuclear thresholds has become more hazy as a result of Pakistan's incorporation of tactical nuclear weapons into its doctrine, raising the possibility of unintentional escalation.[4]

There are multiple reasons why we are at greater risk of miscalculating nuclear deployments, which include technology, evolving philosophy of deployment and command-and-control systems that are more likely to receive strikes from advanced cyber operations. Of more concern, increased military technology, MIRVs, has doubled our target accuracy, and cyber intelligence systems that accidentally block any imminent strikes. Policy analysts and military leaders are more worried because the command-and-control systems are open to cyber manipulation.[5]

Moreover, the absence of formal crisis management mechanisms unlike the Cold War–era hotlines between Washington and Moscow means that South Asian escalation risks rely heavily on political prudence rather than institutional safeguards.

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The Role of Emerging Technologies in South Asian Nuclear Stability

Emerging technologies are rapidly transforming the deterrence landscape in South Asia, introducing new complexities to nuclear stability. India and Pakistan are both investing in advanced systems such as artificial intelligence (AI)-enabled surveillance, cyber capabilities, autonomous drones, and precision-guided munitions that blur the line between conventional and nuclear domains.[1] India's pursuit of MIRVs, hypersonic glide vehicles, and ballistic missile defense (BMD) systems aims to strengthen strategic deterrence against China, but it simultaneously compels Pakistan to enhance its own delivery and penetration capabilities.[2]

Pakistan's weapons and tactical missile systems reflects a strategy of countering India's growing conventional advantage, yet these innovations also raise concerns about command-and-control vulnerabilities and inadvertent escalation.[3]

Furthermore, the integration of AI and autonomous systems into military decision-making could shorten response times and reduce human oversight during crises, amplifying the risks of miscalculation.[4]

Without mutual transparency, crisis communication mechanisms, and regional norms governing emerging technologies, South Asia's deterrence equation may become even more unstable.[5] addressing these challenges through dialogue and technological arms control is therefore essential to sustaining long-term nuclear stability in the region.

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Influence of External Powers

The nuclear landscape of South Asia cannot be understood in isolation from external influences

particularly those of the United States, China, and Russia.[1] these powers shape strategic behavior through arms sales, alliances, and technological transfers that indirectly affect regional deterrence dynamics. The U.S.–India civil nuclear deal of 2008, for instance, marked a major strategic shift. It effectively ended India's nuclear isolation and elevated New Delhi's status as a de facto nuclear power, even though it remains outside the Non-Proliferation Treaty (NPT).[2] this development encouraged Pakistan to deepen its strategic partnership with China, thereby intensifying the triangular balance.

China's role has been especially consequential. As both a nuclear power and a regional competitor to India, Beijing's modernization of its strategic arsenal including new missile silos in Xinjiang and expanded submarine-based deterrence has pressured India to enhance its own capabilities.[3] this cooperation, ranging from civilian reactors to ballistic missile assistance, established Pakistan's deterrent credibility and ensured that India remained strategically contained.[4]

Russia, though less directly involved in South Asian deterrence dynamics, continues to play a stabilizing role through arms exports and strategic dialogue. Moscow's balancing diplomacy maintaining strong defense ties with India while engaging Pakistan on counterterrorism adds nuance to the broader regional equilibrium.[5] meanwhile, the evolving U.S.–China rivalry risks transforming South Asia into an extension of great-power competition, where nuclear postures and alignments are increasingly influenced by external deterrence calculations rather than regional threat perceptions.[6]

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Prospects for Arms Control and Stability

Despite decades of rivalry, there remain limited but significant opportunities to advance arms control and stability in South Asia.[1] However, these prospects depend on political will, institutional mechanisms, and the reduction of deep-rooted mistrust. The existing framework comprising modest confidence-building measures (CBMs) has so far prevented major miscalculations but remains insufficient to address more complex challenges like missile deployments or tactical nuclear weapons. [2]

Future progress requires broadening dialogue beyond traditional bilateralism. Including China in regional arms control discussions could help balance asymmetries, given its central role in India's nuclear calculus and its longstanding support to Pakistan.[3] Such a trilateral or multilateral dialogue would not only improve transparency but could also help stabilize deterrence by clarifying intentions and avoiding misperceptions. Track-II diplomacy through think tanks, retired officials, and civil society has already demonstrated potential in generating informal consensus during crises.[4]

Institutionalization of nuclear risk-reduction centers and hotlines could serve as immediate confidence-building measures.[5] additionally, both countries might consider adopting nuclear restraint agreements that cap fissile material production or establish verification mechanisms under international supervision. Though politically challenging, incremental measures could gradually normalize nuclear relations.

Yet, as scholars like Scott Sagan argue, arms control can only succeed when states address the underlying political conflicts that drive insecurity.[6] In South Asia, that means progress on Kashmir, cross-border terrorism, and domestic political narratives that glorify nuclear deterrence. Without movement on these core issues, technical

measures will remain fragile. Sustainable arms control in South Asia thus requires both political courage and a shared recognition that deterrence without dialogue is inherently unstable.[7]

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Emerging Dynamics (2023–2025)

Recent years have demonstrated that nuclear deterrence in South Asia remains fragile and continually tested by new security and technological pressures. The 2025 Pahalgam attack and ensuing cross-border strikes once again highlighted how quickly sub-conventional violence can escalate toward nuclear signaling.[1] Both India and Pakistan raised their alert levels, reflecting persistent mistrust and limited crisis-management mechanisms. At the same time, India's expanding strategic partnerships with the United States and France particularly in defense technology and space cooperation have reinforced its global ambitions, while Pakistan's deepening alignment with China has entrenched regional polarization.[2]

Technological modernization further complicates deterrence stability. In terms of counterforce capability, the test of the Agni-V intercontinental ballistic missile fitted with MIRVs in India in 2024 was a major stride.[3] Pakistan, meanwhile, has advanced its solid-fuel missile systems and command-and-control resilience to enhance survivability.[4]

The integration of artificial intelligence, cyber tools, and dual-use technologies into military planning raises new risks of accidental escalation or misinterpretation. As global great-power rivalry between the United States and China intensifies, South Asia's nuclear dynamics are increasingly shaped by external deterrence logics, underscoring the urgent need for renewed dialogue and institutionalized arms control mechanisms.[5]

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Humanitarian and Environmental Consequences of a Nuclear Exchange in South Asia

While technological innovation continues to redefine deterrence dynamics in South Asia, the conversation on nuclear weapons remains incomplete without considering their potential human and environmental toll. While strategic doctrines and deterrence theories dominate discussions of nuclear arms control, the humanitarian and environmental dimensions of a potential nuclear exchange in South Asia remain gravely under examined.

Even a limited regional conflict involving as few as 50 to 100 nuclear detonations could inject millions of tons of black carbon into the atmosphere, blocking sunlight and producing global temperature drops of 1–2°C a phenomenon known as "nuclear winter."[1] Such climatic disruptions could devastate agriculture across Asia, leading to large-scale famine and economic collapse.[2]

Given South Asia's dense populations and urban proximity, immediate casualties from blast and radiation effects could exceed tens of millions, while long-term impacts cancer, genetic damage, and ecological contamination would persist for decades.[3] The collapse of critical infrastructure, coupled with radioactive fallout contaminating the Indus and Ganges river systems, would further intensify humanitarian suffering.[4] These catastrophic outcomes underscore the need to reframe nuclear discourse from issues of prestige and deterrence toward human security and environmental preservation. Integrating humanitarian perspectives into arms control dialogues can generate new moral and political imperatives for restraint, fostering an understanding that nuclear stability cannot be separated from the survival of societies and ecosystems.[5]

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Conclusion

Nuclear arms control in South Asia remains a formidable challenge shaped by history, politics, and emerging strategic realities. India and Pakistan's nuclear doctrines continue to mirror their divergent priorities India's pursuit of global recognition and Pakistan's quest for security parity. While nuclear deterrence has prevented an all-out war, it has simultaneously encouraged risky doctrines, crisis instability, and lowered thresholds for escalation.

The crises since 1998 Kargil, the 2001–2002 standoff, Mumbai 2008, Pulwama–Balakot 2019, and the recent 2025 Pahalgam conflict demonstrate how fragile deterrence remains in South Asia. The events of 2023–2025 further reveal that modernization efforts, such as India's Agni-V MIRV test and Pakistan's enhanced solid-fuel systems, are intensifying the arms race rather than stabilizing it.

Meanwhile, deepening alignments India with the United States and France, and Pakistan with China have internationalized the region's nuclear competition, making crisis management more complex and escalation more likely.

The path toward meaningful arms control lies in acknowledging these evolving dynamics while reinforcing traditional confidence-building measures. Establishing nuclear risk-reduction centers, transparent communication channels, and regional arms limitation frameworks could help lower tensions. Yet, technical solutions alone are insufficient. Without political progress on core disputes such as Kashmir and without addressing the narratives of national pride tied to nuclear capability, arms control efforts will remain fragile.

In an era where global polarization and technological competition increasingly shape South Asia's security environment, the need for sustained dialogue and institutionalized restraint is more urgent than ever. Reducing nuclear risks is not merely a regional imperative it is essential for preserving global stability in an uncertain and rapidly changing strategic landscape.

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