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Challenges to Nuclear Non-Proliferation in South Asia since 1998: A Case Study of India and Pakistan

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Abstract

The nuclear non-proliferation regime faces significant challenges in South Asia, particularly within the context of India and Pakistan. This research delves into the multifaceted dynamics that hinder the effectiveness of non-proliferation efforts in the region. Both India and Pakistan, possessing nuclear capabilities, have remained outside the Nuclear Non-Proliferation Treaty (NPT), Comprehensive Test Ban Treaty (CTBT) and Fissile Material Cut Off Treaty (FMCT) complicating international efforts aimed at curbing the spread of nuclear weapons. Historical hostility, unresolved territorial disputes such as Kashmir, and security concerns have driven India and Pakistan towards nucleation, despite international pressure. The presence of nuclear arsenals in the region increases the risks of nuclear conflict, especially given the history of military confrontations and the absence of robust communication channels. Furthermore, the lack of trust between the two nations, coupled with domestic political considerations, undermines efforts towards arms control and disarmament. This research critically analyzes the factors contributing to the defiance of nuclear non-proliferation norms in South Asia, including regional

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power dynamics, security dilemmas, and the role of external actors. Additionally, Indo-US cooperation for civilian nuclear program which will spare their use for military purpose, development of ballistic missiles like Agni 5 from Indian side and lastly India's shift of policy from No 1st use to pre-emptive counter force retaliation are big contemporary challenges to nuclear nonproliferation. Understanding these challenges is vital for formulating effective strategies to promote stability and enhance non-proliferation efforts in the region.

***Keywords**: Nuclear Non Proliferation, Nuclear Deterrence**,** Comprehensive Test Ban Treaty (CTBT), Strategic Stability in South Asia, Indo-US Nuclear deal.*

Introduction

Since the beginning of history, man has faced several security problems. As security plays a significant role in states survival, states develop weapons of modern technologies to come out of this security problem. In a subjective sense, security is the absence of anxiety that one's acquired values would be attacked, and in an objective sense, security is the absence of threats to those values. In this nuclear age, states have been developing new kinds of sophisticated weapons to ensure their security. The world has witnessed the catastrophe of nuclear weapons in Hiroshima and Nagasaki in 1945. Since then, the international community has been taking measures to control the proliferation of nuclear weapons.

The international non-proliferation landscape has been shaped by the continuous evolution of nuclear weapons and global efforts to control their spread. Since the use of nuclear weapons by the US in 1945, efforts to regulate nuclear technology have remained an important aspect of international politics. The UN and various treaties and agreements, such as the Nuclear Non-

Proliferation Treaty (NPT), Comprehensive Test Ban Treaty (CTBT), and Fissile Material Cut-off Treaty (FMCT), form the backbone of the international non-proliferation regime. India and Pakistan are de-facto nuclear weapon states in South Asia which are continuously challenging the security of region. Both countries are reluctant to sign NPT, CTBT, and FMCT with their due concerns, which is a big challenge to nuclear nonproliferation regime. A closer look at the recent developments in the region reveals that both the aforementioned countries are moving towards vertical proliferation. Under Indo-US nuclear cooperation for civilian nuclear program, the US is assisting India with nuclear technology which is deeply concerning for Pakistan. The Indo-US civil nuclear agreement was signed in 2005 and came into force in 2008.[1] This agreement allowed India to obtain nuclear technology and fuel from international market despite not being a signatory to NPT. Nuclear Supplier Group (NSG) also gave wavier to India in 2008.[2] This agreement was amended in 2016 which facilitated export of nuclear reactor components from US to India. Besides this, India signed many military modernization agreements with the US, such as the Communications Compatibility and Security Agreement (COMCASA) and Basic Exchange and Cooperation Agreement (BECA).[3] India is also developing missile technology (development of Agni-V and MIRVs) which will require more fissile material to meet its nuclear requirements. In March 2024, India successfully conducted first test flight of home-grown missile equipped with MIRV technology.[4] Pakistan has also developed air and land delivery systems, and in recent years has made progress in developing sea-based delivery systems.

Moreover, India is also shifting its policy from No 1st use to pre-emptive counter force retaliation. India also intends to develop second strike capability to maintain deterrence. While, Pakistan aimed to develop second strike capability but is facing problems of limited resources. However, it is persistent in its efforts as demonstrated by the January 2017 test of Babur III, a submarine-launched cruise missile.

Historical Background

To understand challenges to nuclear nonproliferation in South Asia there is a need to understand the historical context of both countries in the region. Since their independence in 1947, India and Pakistan engaged in major territorial conflicts (Kashmir and Sir Creek), security issues (terrorism), resource limitations and energy deficits (energy scarcity), strategic uncertainty (arms race), and geopolitical scheming (proxy war in Afghanistan). Presently, between 25 and 30 per cent of Pakistanis, or 60 million people—roughly twice the size of Texas' population—live in poverty, while a comparable percentage of Indians are impoverished.[5] Because of these issues they have fought three full scale wars (1947,1965 and 1971) before acquiring nuclear weapons and many limited conflicts after developing nuclear weapons.

The 1971 war gave rise to an important shift in South Asia, with India emerging as a dominant regional power. The Pakistan India 1971 War led to the creation of Bangladesh and enhanced tensions in South Asia. India carried out nuclear test in 1974, which it called a 'Peaceful Nuclear Explosion', named by Smiling Buddha depicting that, it had the ability to develop nuclear weapons. India conducted more nuclear tests in May 1998 and declared itself a nuclear weapon state. This pushed Pakistan to

carry out its own tests, starting an arms race and making the region less stable. Although the first nuclear cold test by India took place in 1974, its intent was dubious from very start of program. The following statement by PM Jawahar Lal Nehru in 1946 shows that India was trying to get nuclear weapons from the start: "As long as the world is constituted as it is, every country will have to devise and use the latest devices for its protection. Without a doubt, India will advance its scientific endeavors, and I hope that its scientists will harness the power of atomic force for good. But India will unavoidably attempt to defend itself using all of her resources if she feels threatened.[6] The high populations and weak emergency services in South Asia mean that any nuclear conflict would have catastrophic effects, raising serious concerns about the safety and security of the region and the world."

Pakistan began working on its nuclear program in the 1950s through atom for peace program. Through this program, the US had decided to transfer nuclear technology to its allies for peaceful purposes. Before 1965, Pakistan was striving for civil nuclear technology. But in 1965 it started working for nuclear weapon technology despite the bureaucratic hurdles in its way. Zulfiqar Ali Bhutto was a strong proponent of acquiring nuclear weapons. As a member of the Cabinet, he tried to convince Ayub Khan to begin nuclear weapon program along with civilian program. But General Ayub along with Dr. Ishrat Usmani were reluctant. Bhutto in his book, Myth of Independence, writes that modern military strategies were linked with nuclear deterrence and we must get for our survival.[7] Mr. Bhutto was so adamant to develop nuclear weapons, he came in public with the slogan that; "we will eat grass or we will go hungry, but we will develop our own Atom bomb. I warned the nation sometime back that if India

acquires nuclear status, Pakistan will have to follow suit even if it entails eating grass." [8] Ghulam Ishaq khan and Dr. Abdul Qadeer Khan were strong allies of Zulfiqar Ali Bhutto. PAEC chairperson Munir Akram started this program, but progress was slow. In 1974 Dr. Abdul Qadeer khan joined nuclear program. In cold war US uplifted sanctions from Pakistan which worked as a catalyzer for Pakistan to carry its nuclear program. Till 1984 Pakistan was able to produce enriched uranium which can be used in nuclear weapons. On 28 May 1999 Pakistan declared itself as a nuclear weapon state by conducting seven nuclear attacks to deter India.

With regards to India and Pakistan and NPT, CTBT and FMCT, until now, 187 states have signed CTBT, and 178 of them have ratified it. However, Pakistan and India have not signed CTBT.[9] This treaty aims to ban all types of explosions. Both states have also been reluctant to negotiate FMCT.[10] India and Pakistan developed their nuclear weapon after 1970, i.e., after NPT came into force. So, they *are de*-jure nuclear weapon states. India refused to sign NPT calling it discriminatory, while Pakistan linked its stance with India's action and has not signed NPT either. [11]

Current Challenges to Nuclear Non Proliferation Regime in South Asia

There are multilateral arms control and disarmament treaties like NPT, CTBT and FMCT and some formal and informal Nuclear Export Control Regime for example, International Atomic Energy Commission (IAEA), Nuclear Supplier Group (NSG) and Missile Technology Control Regime (MTCR). Despite these efforts Nuclear Non Proliferation Regime is facing challenges in South Asia because of number of reasons. Firstly, both India and Pakistan are not a part of the NPT. India rejected it by calling it

discriminatory which is dividing world between haves and have nots and Article VI of NPT obliges Nuclear Weapon State (NWS) to negotiate in good faith towards nuclear disarmament but instead US and Russia are not meeting their promise and thirdly, India feels threatened from China. On the other hand, Pakistan's sole reason for not signing the treaty is rooted in India's refusal to do the same. Although NPT prevents horizontal proliferation like Brazil, Sweden and Libya had abandoned their nuclear ambition at that time and countries like Kazakhstan, Ukraine and South Africa gave up their nuclear weapon in 1990s by signing NPT.

With regards to CTBT both India and Pakistan put their efforts in drafting the treaty but did not sign it in 1996 because India alleged that it will not sign it until and unless US and China would become signatory of the same. While on the other hand Pakistan will decide after India will sign it. The FMCT on the other hand, has not been drafted yet. But both India and Pakistan have concerns about its rules. India contends that this treaty should not talk about existing fissile material stockpiles while Pakistan is concerned about the same vis a vis India.

India got wavier from NSG in 2008 with help of US and MTCR in 2016 while, Pakistan did not get any so this is discriminatory. Once India and Pakistan applied for NSG membership in 2016 but was rejected by member states of NSG. These discriminatory policies relating to nuclear cooperation by American-based western countries is creating imbalance and insecurity that compelled Pakistan to take a hard stance. There are less chances that both states will sign NPT as Non-Nuclear Weapon States (NNWs) but there are chances that both states will sign CTBT and FMCT if united states, China and Russia will sign these treaties first.

Indian Nuclear Doctrine- 2003

Indian Nuclear Doctrine started as civil nuclear doctrine. The draft of nuclear doctrine was introduced in 1999. It was just a draft nuclear doctrine. In 2003 the final document came. The first thing that it considered was was no 1st use entailing that India will not use its nuclear weapon first, however, a closer analysis of the clause reveals something different:

"No Fist Use: 'Nuclear weapon will only be used in retaliation against a threat of nuclear, chemical and biological attack on Indian territory or on Indian forces anywhere."[12]

It is based on their own threat assessment, meaning that if they face any imminent threat from Pakistan for instance, before Pakistan uses nuclear weapons, they may use nuclear weapons. Which means it is in fact 1st use. Secondly, if India is attacked by chemical or biological weapons, other than nuclear weapons then it will retaliate with nuclear strike. So, this is extremely dangerous because their perception may be wrong. This ambiguous element of restraint is extremely threatening for South Asia. Moreover, India contends that it has Credible Minimum Deterrence (CMD).[13] This strike provides it with an option to carry out a strike after absorbing the 1st strike. This strategy is ambiguous because 'the minimum of India' remains unclear, for example, if China has 434 nuclear warheads so what will India do? Are they going to acquire 400 plus nuclear weapons just to make sure that they have credible deterrence? This is critical for Pakistani thinkers and South Asian security.

Third point of Indian nuclear doctrine is 'Nuclear retaliation to the 1st strike will be massive and designed to inflict unacceptable damage'. It is again ambiguous, are they going to attack Karachi? Are they going to take Pakistani capital? We do not

know. Nuclear retaliatory strikes can only be approved by the civilian political leadership via the Nuclear Command Authority, according to the fourth point. Now civilian leadership is led by PM Modi. Modi has a legacy of Hindutava ideology, so the things are not in favour of Pakistan.

The fifth point highlights India's plan to establish and enhance its Triad Force, which involves deploying nuclear weapons across air, sea, and land. Currently, the Indian Air Force (IAF) operates advanced aircraft like the Sukhoi Su-30MKI (a Russian-designed fighter jet) and the recently acquired Rafale jets. These aircraft are highly capable, with the Su-30MKI boasting a range of 3,000 km (approximately 1,864 miles), enabling the IAF to conduct nuclear strikes if necessary. Strategically, India is equipping its Air Force with cutting-edge technology to bolster its defense against its two primary adversaries, China and Pakistan. This arsenal includes the IL-78 air-to-air refueling aircraft, the Phalcon airborne early warning and control system, and the Sukhoi Su-30MKI, a sophisticated multirole combat fighter.[14]

Secondly, India's Navy also possesses the capability to launch nuclear weapons. For example, the Arihant-class submarines, which are nuclear-powered, play a critical role in India's nuclear triad. INS Arihant (S2), the first of its class, was launched in 2009, began sea trials in December 2014, and was commissioned in August 2016. However, the construction of these strategic submarines (SSBNs) has faced delays due to challenges in miniaturizing the nuclear reactor to fit within the submarine's design. Additionally, accommodating the larger K-4 missiles, with a range of 3,500 km (approximately 2,175 miles), has proven difficult, as engineers work to optimize space and

functionality. These submarines enable India to target distant locations, such as from the Bay of Bengal, ensuring a robust second-strike capability. Thirdly, India's Army is equipped with a range of nuclear-capable missiles, including the Prithvi series, Suriya, and the recently tested Agni-V missile, which boasts a range of 5,000 km (approximately 3,107 miles).[15]

India appears to be signaling a potential shift in its nuclear policy from a "No First Use" stance to a more flexible posture, including preemptive counter-force retaliation. Defense Minister Rajnath Singh remarked, "Till today, our nuclear policy is 'No First Use.' What happens in the future depends on the circumstances." His statement, made during an event in Pokhran—the site of India's 1998 nuclear tests—has sparked significant discussion and speculation. This shift, if formalized, could mark a strategic recalibration in India's nuclear doctrine in response to evolving security challenges.[16]

Pakistan's Nuclear Doctrine

The acquisition of nuclear weapons by the US and USSR was primarily driven by their ambitions for global hegemony and superpower status, rather than genuine security concerns. In contrast, nations that followed—such as China, France, and the UK—developed nuclear weapons largely for security purposes. The UK and France, at the time, faced significant threats from a far more powerful USSR, prompting their nuclear programs. Similarly, China pursued nuclear weapons to address its security needs.

India's nuclear ambitions, however, were driven more by aspirations for major power status than by immediate security concerns. In 1952, Indian Prime Minister Jawaharlal Nehru

reportedly asked physicist Homi Bhabha if India could build a nuclear weapon. Bhabha confidently replied that it could be achieved within three years, demonstrating India's advanced technological capabilities even then. The focus on nuclear capability was, in essence, a strategy for establishing India as a global power. Furthermore, B.K. Nehru, Nehru's cousin and a former ambassador to the US, recalled asking Bhabha in 1951 why he wasn't working on a bomb. Bhabha revealed that Nehru had explicitly prohibited it, stating, "The old man won't let me. He has approved my plans for atomic energy but under no condition am I to manufacture a weapon." This underscores the early ideological resistance to weaponization, even as the technical groundwork for nuclear development was being laid.[17]

On the other hand, India's narrative of citing China and Pakistan as the primary drivers for its nuclear program appears ambiguous. In contrast, Pakistan's acquisition of nuclear weapons was driven solely by security imperatives. Since 1947, Pakistan has faced significant threats to its territorial sovereignty and integrity from both India and Afghanistan. Initially, Pakistan sought security through alliances like SEATO and CENTO. However, following the 1965 war with India, a realization emerged within Pakistani leadership that the country needed to develop nuclear weapons to ensure its survival. In 1969, Zulfikar Ali Bhutto, in his book *The Myth of Independence*, stated:

> *"All wars of our age have become total wars; all European strategy is based on the concept of total war; and it will have to be assumed that a war waged against Pakistan can become a total war. It should be*

dangerous to plan for less, and our plan should, therefore, include nuclear deterrence."

The 1965 war, a full-scale conflict, underscored Pakistan's vulnerabilities. Despite surviving miraculously and requesting a ceasefire through the UN, the war solidified the belief that nuclear deterrence was essential to prevent future aggression. Thus, Pakistan's nuclear program was conceived to avert war by establishing credible deterrence. Pakistan's nuclear doctrine is fundamentally India-centric, shaped by the four wars fought with India and unresolved bilateral issues, including the Kashmir dispute, water-sharing conflicts, terrorism, extremism, Siachen, Sir Creek, and Indian-occupied Kashmir. Given these persistent tensions, Pakistan's threat perception remains heavily focused on India. To address its security challenges, Pakistan emphasizes having a small but credible nuclear arsenal. Pakistan's policy of a potential "first use" of nuclear weapons stems from its limited strategic depth (geographical constraints), a fragile economy incapable of sustaining prolonged conflict, and the disparity in conventional military capabilities compared to India. The National Command Authority (NCA) centrally controls Pakistan's nuclear arsenal, ensuring a calculated and guided decision-making process.

Pakistan has identified specific red lines that could prompt the use of nuclear weapons:

1. **Loss of Territory**: If India attacks and captures a significant portion of Pakistani territory.
2. **Destruction of Forces**: If India destroys a substantial part of Pakistan's land and air forces.

3. **Economic Strangulation**: If India proceeds to cripple Pakistan economically.
4. **Political Destabilization**: If India incites large-scale political instability or internal subversion.
5. These conditions underline Pakistan's reliance on nuclear deterrence as a means to safeguard its sovereignty and prevent escalation to full-scale war.

Arms Race and Modernization

Security Competition

India and Pakistan have been engaged in an ongoing competition involving nuclear, missile, and conventional arms development. This paper focuses on developments over the last decade that have heightened Pakistan's threat perception, prompting it to pursue Tactical Nuclear Weapons (TNWs) and maintain a robust nuclear arsenal. These key developments include India's Ballistic Missile Defense (BMD) system, the Cold Start Doctrine, and the Indo-US Nuclear Deal of 2006.

As is well-established, heightened security dilemmas often compel states to expand their arsenals. When one state perceives its adversary as growing militarily stronger, it tends to respond by developing more advanced weaponry, fueling a cycle of mutual distrust and escalation. This environment exacerbates the security dilemma, making the arms race more intense and destabilizing for regional security.

Neorealism argues that states operate in an anarchic international system where they are solely responsible for their own security, guided by the self-help principle.[18] In such a system, states employ two key strategies to counter threats: internal

balancing, which involves building economic and military strength, and external balancing, which entails forming alliances.[19] Pakistan has adopted a mix of these techniques to address threats from its primary rival, India. Since 1947, Pakistan has worked to bolster its conventional forces while also pursuing nuclear weapons to counterbalance India's larger military capabilities. Additionally, strategic alliances with countries like Saudi Arabia, the United States, and China have been integral to Pakistan's foreign policy, providing economic support, military assistance, and geopolitical leverage.

Development of Ballistic Missiles

The security competition between Pakistan and India is reflected in their efforts to acquire and develop advanced delivery systems for nuclear weapons. India has adopted a nuclear strategy centered around its Triad forces, which has driven the development of its ballistic missile program. In response, Pakistan has made significant advancements in air and land-based delivery systems and is also progressing in sea-based capabilities. India's pursuit of a second-strike capability aims to enhance its strategic deterrence and consolidate its position as a regional power. Similarly, Pakistan has expressed its intent to achieve a second-strike capability, despite its resource limitations. The successful test of the Babur-3 submarine-launched cruise missile (SLCM) in January 2017 underscores Pakistan's commitment to this objective. While India has taken the lead in missile development, Pakistan has also followed a similar trajectory. As Rodney Jones aptly notes, "As with nuclear weapons capabilities, India has set the pace in the acquisition of missile delivery capabilities on the subcontinent." This ongoing competition underscores the

persistent arms race between the two nations, further intensifying regional security dynamics.[20] Pakistan says it has no intent to match with India missiles but due to maintain credible minimum deterrence to ensure security it is engaged in arm race

Table No. 1

Indian Nuclear Capable Missile

Type	Range (km)	Payload	Status
Land based Ballistic Missiles			
Prahaar	150	200	Tested, conventional and nuclear capable.
Prithvi I/II	150/350	800/500	Prithvi I reportedly nuclear capable, in service since 1994. Prithvi II reportedly nuclear capable, deployed
Agni I	700	1000	Deployed with Indian Army's 334 Missile Group
Agni II	2000	1000	Deployed with Army's 555 Missile Group
Agni III	3000	1500	Inducted into service but not fully operational.
Agni IV	4000	1000	Tested
Agni V	>5000	1000?	Tested
Sea based Missiles			
Dhanush	350	500	Induction under way, last tested in November 2015
K-15 (Sagarika)	700	500-600	Tested November 2015from submarine INS Arihant. Under production
K-4	3000		Last Tested in April 2016

Source: *SIPRI Yearbook 2015, Armaments, Disarmaments, and international security.*
(Oxford University Press, 2015), p. 498.

Table No. 2

Pakistan Nuclear Capable Missile

Type	Range (km)	Payload	Status
Land Based ballistic Missiles			
Abdali (Hatf-2)	180	200-400	Under development, test launched on 5 and 11 Mar, 2002
Ghaznavi (Hatf-3)	290	500	Entered service with Army in 2004
Shaheen I (Hatf-4)	650	750-1000	Entered service with Army in 2003
Ghauri (Hatf-5)	>1200	700-1000	Entered service with Army in 2004
Shaheen II (Hatf-6)	2500	1000	Under development, last tested Apr 21, 2008
Nasr (Hatf-9)	60		Under development, last test May 29, 2012
Cruise Missiles			
Babur (Hatf-7)	600	400-500	Under development. Tested on Sep 17, 2012, initially land based but reportedly air and see based versions under development
Ra'ad (Hatf-8)	350		Under development, air launched, last test May 31, 2012
Babur 3	450		Tested January 2017, its first Sabmarine launched Cruise Missile (SLCM)[21]

Source: *SIPRI Yearbook 2015, Armaments, Disarmaments, and international security*
(Oxford University Press, 2015), p. 504.

India's advanced development of ballistic missiles, particularly the Agni-V equipped with Multiple Independently Targetable Re-entry Vehicle (MIRV) technology, represents a significant enhancement in its strategic capabilities. This technology enables a single missile to carry multiple warheads, each capable of striking different targets independently. Such advancements not only bolster India's deterrence by

complicating missile defense systems but also pose a significant challenge for Pakistan.

In response, Pakistan conducted a successful test launch of its Ababeel missile in October 2023, which also features MIRV technology. This marks a notable step in Pakistan's missile development program, showcasing its efforts to counter India's advancements and maintain strategic parity.

However, the continued development of ballistic missiles with MIRV capabilities necessitates greater production of fissile material. Both countries are consequently expanding their domestic fissile material production capacities, leading to an intensified nuclearization of South Asia. This arms race further undermines the nuclear nonproliferation regime in the region, raising concerns about stability and security in an already volatile environment.

Domestic production of Uranium (Minning and Milling) in India and Pakistan

Being non-signatory to nuclear nonproliferation (NPT) both India and Pakistan are facing problems in getting fissile material from international sources. Both countries have ongoing nuclear weapon programs, and they need fissile material for that because domestic production is not meeting the requirements. The increasing demand for uranium in both countries suggests they will increase their domestic production soon.

Pakistan’s Minning and Milling of Uranium

Currently, Pakistan is operating five nuclear reactors, under Pakistan Atomic Energy Commission (PAEC). From these five, four Chinese based 325-megawatt reactors are in Khashab

and one 125-megawatt reactor of Canadian based and there are more which are under construction. For example, Pakistan is making additional three 1000MW of reactors which are under process. Enormous amounts of uranium are required to run these reactors. Despite Pakistan have uranium Mining operation but still it is not producing enough uranium to rum its nuclear reactors. According to earlier research on Pakistan's Khushab reactors, four reactors running at 70% efficiency may need a total of 70 tU year.[21]The IAEA/OECD "Red Book" reports that Pakistan mines about 45 tons of uranium (tU) each year. This amount falls short of meeting the country's growing uranium needs. Pakistan mines uranium from many places like Nangana, Taunsa, Qabul Khel, and Bagha chore. Pakistan has started more mining projects near the city of Shanawa. Pakistan is working with international organizations, for example currently, Pakistan is working in close collaboration with the China National Nuclear Corporation (CNNC), for uranium exploration and development.

Pakistan wished to enhance its domestic uranium supply because it is facing problems in accessing the international market. However, there are several challenges, for example the varying quality of uranium ore deposits, a lack of detailed data, and less visible in-situ leaching (ISL) mining methods. These factors make it difficult to compare and gather data between countries.

India’s Minning and Milling of Uranium

Supply and Demand of Uranium

In January 2015, a report mentioned that India is operating 21 reactors out of which 18 reactors are pressurised heavy water and two are boiling water reactors and one is light water which

concludes in generation of 5.3 giga watt per annum. The report further states that construction of four more heavy water reactors and one light water reactor is under process in addition to a chance that they are creating a fast breeder reactor as its prototype has already been formed. The requirement of uranium in pressurised heavy water reactor is currently gathered by a combination of imported as well as indigenous resources where the two boiling water reactors and the light water reactor has a specified requirement of enriched uranium.

Carbonate deposits	42.24%
Metamorphite	31.55%
Sandstone-type	10.33%
Unconformity-type	9.95%
Metasomatite	3.74%
Granite-related	1.99%
Quartz pebble conglomerate	0.19%

As of January 1, 2015, the known conventional resources established so far include 160,033 tU of RAR and an additional 21,573 tU of inferred resources.[22]

India utilises a combination of open-pit and underground mining; although ISL is being explored as a potential extraction method for future projects, it is not practiced in India currently.[23]

In the growing demand of uranium, the government of India and other organization related to uranium are working on the full care for the development of three additional production centers of uranium. Following are the names of uranium related projects: Lamdapur Peddagaddu, Kylleng Pyndengsohiong Mawthabah, and Gogi Karnataka.[24] All these projects face high resistance from all sectors, such as health, environment, and

industrial sector. Anew Mining project known as Rohil Deposit has also taken place and is on an advance level near Rajasthan area.

In the starting of nuclear era the nuclear technology and its possession was only in the hands of international community and to regulate the technology and supply of nuclear material was highly controlled by the international powers forming a set of rules to control over supply and decision making related to nuclear technology was done by Non-Proliferation Regime (NPR). The Treaty on the Non-Proliferation of Nuclear Weapons (NPT), which has been in effect for over fifty years, was established to regulate the control of nuclear fissile material and technology. Despite this global effort, India has maintained a privileged status in the international arena. While the world was divided into nuclear "haves" and "have-nots," India developed its nuclear weapons program, shifting South Asia's strategic balance towards hegemony.

By 2023, it had been approximately 25 years since India conducted its nuclear tests in 1998 and 15 years since the United States finalized the Indo-US Civil Nuclear Agreement, also known as the 123 Agreement. This deal, facilitated by the Bush administration, lifted the nuclear embargo on India, causing significant damage to global nonproliferation efforts. India's status as a declared nuclear state, its rejection of the NPT, and its continued pursuit of nuclear weapons and arms control measures have raised concerns about its contribution to South Asia's strategic stability. The Nuclear Suppliers Group (NSG) played a pivotal role in facilitating nuclear trade with India, despite India not being a signatory to the NPT. This move undermined global nonproliferation objectives and destabilized the strategic equilibrium in South Asia. India capitalized on these

developments by signing 16 nuclear deals with countries such as Japan, Russia, France, Australia, and the United Kingdom. These agreements significantly enhanced India's nuclear capabilities while contributing minimally to the broader geostrategic stability of the region.[25]

Nuclear Exceptionalism for India

At the global level, the United States plays a crucial role in maintaining world peace and order, positioning itself as a self-proclaimed champion of human rights. However, it provides special treatment to certain states, turning a blind eye to human rights violations in some cases. Additionally, the Atomic Energy Act is directly overseen by the U.S., granting it ultimate authority over the regulation and production of nuclear materials, thereby creating a monopoly over global uranium reserves for decades. This exceptionalism extended to India, while Pakistan was excluded, deepening the divide between nuclear "haves" and "have-nots." India capitalized on this preferential treatment, benefiting from American and Israeli nuclear exceptionalism, and began to see itself as a unique power with the right to claim special entitlements in the South Asian region. In violation of international norms, India carried out military strikes in Jammu and Kashmir, signaling its belief in the strategic support it received from global powers like the U.S.

India's involvement in illegal nuclear fuel trade from Canada further fueled concerns, and this violation played a significant role in the establishment of the Nuclear Suppliers Group (NSG). For over thirty years, the United States itself refrained from signing a nuclear nonproliferation agreement, until its geopolitical priorities shifted in 2005. Under President

Bush, the US allowed nuclear trade with India, and in 2008, a special waiver was granted to India by the NSG under U.S. pressure. Even now, India does not fully allow the IAEA to inspect its nuclear facilities, which it claims are for peaceful purposes.

In 2016, India applied for NSG membership, and seven days later, Pakistan submitted its own application, based on a nondiscriminatory approach. It is widely believed that Pakistan's application had stronger credentials, and this led to the delay of India's membership. Despite this, India's nuclear program and its aggressive policies continue to signal its ambitions for regional hegemony. India's posture, combined with its offensive policies, has been a significant factor in the ongoing conflicts and instability in Pakistan. The US largely regards India as a "swing power" or "balancing power" rather than a major power, with its actions in the region highlighting its ambitions to secure greater influence and strategic advantage.[26] Although India will not be able to become a global power in near future, its hegemonic behavior will undermine deterrence stability in the region.[27] The exceptionalism shown towards certain countries, such as India, in the realm of nuclear technology transfer. This exceptional treatment not only weakens the global non-proliferation regime but also sets a dangerous precedents for other states to seek similar preferential treatment, potentially leading to a proliferation of nuclear capabilities and increased risks of conflict.

Policy Recommendations

Advisor to the National Command Authority Lt Gen (retd) Khalid Ahmed Kidwai has underscored Pakistan's stance on not committing to the No First Use (NFU) policy regarding nuclear weapons.[28] Pakistan intends to leverage modern technologies to

enhance its nuclear weapons program, emphasising the need for a strong nuclear defense against its larger neighbor. This statement by the Chairperson of the Strategic Plans Division (SPD) followed recent remarks by Indian political leaders, including Prime Minister Modi, who downplayed Pakistan's nuclear capabilities during his election campaign. While the prospect of concrete steps toward nuclear disarmament seems unlikely in the near future, there is a growing concern that vertical proliferation may continue. However, there is hope for a better future if both India and Pakistan agree to adopt the following guidelines:

1. **Adherence to International Norms**: Both countries must be encouraged to adhere to international norms and rules, particularly the Nuclear Nonproliferation Treaty (NPT). Signing and rigorously following the guidelines set by the Nuclear Suppliers Group (NSG) would demonstrate a commitment to preventing the spread of nuclear weapons globally and contribute to South Asia’s security.
2. **Promoting Transparency and Confidence-Building Measures**: Transparency in nuclear facilities and activities can help reduce mistrust and minimize the risks of miscalculation or conflict. Regular information exchanges on nuclear programs, joint monitoring initiatives, and active participation in regional nuclear security dialogues are vital for improving transparency and building mutual confidence. These steps would also alleviate concerns regarding the intentions and capabilities of each nation's nuclear arsenal.
3. **Enhancing Regional Cooperation on Nuclear Security**: Initiatives such as sharing best practices in nuclear safety and security, joint monitoring of uranium mining and

milling, and developing a regional mechanism for crisis management should be explored. These efforts can help prevent misunderstandings, reduce the risk of accidents, and promote a safer regional environment.

4. **Addressing Energy Security and Diversification**: As the demand for uranium grows due to expanding nuclear energy programs, both India and Pakistan should prioritize the diversification of their energy sources. Shifting towards nuclear power could help meet growing energy demands while promoting regional stability.
5. **Strengthening Domestic Safeguards and Regulatory Frameworks**: Both nations must reinforce domestic safeguards and regulatory frameworks to ensure secure and transparent management of nuclear resources. This includes stringent export controls, enhanced physical security at nuclear facilities, and improved oversight of uranium mining and milling operations to prevent illicit proliferation activities.

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