

CHAPTER 3
PAKISTAN: CLIMBING THE
NUCLEAR LADDER

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This chapter traces the early development of Pakistan's nuclear weapons; follows the subsequent evolution of its nuclear objectives and postures; identifies the stages by which a Pakistan–India nuclear crisis could escalate; and examines whether mutual deterrence can be considered robust.

South Asia's nuclear history begins in 1948, a year after Partition. Prime Minister Jawaharlal Nehru, on the advice of the brilliant Cambridge-educated nuclear physicist, Dr Homi Jehangir Bhabha, who was both his confidante and scientific advisor, ordered the establishment of the Atomic Energy Agency Commission of India. While the AEC's public position was to work towards generating nuclear energy for electricity generation, earth excavation, medical technology, and other peaceful purposes, Bhabha struggled to keep its mandate deliberately ambiguous so that the AEC could also conduct secret weapons-related research.^{1,2} Nehru agreed, though he was less enthusiastic about nuclear weapons. Bhabha's carefully argued freedom would eventually lead to the development of India's nuclear weapons. A new nuclear vigour came with the Sino–Indian border war in 1962, and soon India quietly embarked on its quest for the bomb. Violating the terms on which Canada had provided the Cirus CANDU-type nuclear reactor, plutonium was stealthily reprocessed from its spent fuel. In 1974, just as Prime Minister Indira Gandhi was in deep political trouble, the 'Buddha smiled' over the Pokharan nuclear test site.

In Pakistan under General Ayub Khan (1958–1968), there was no movement or enthusiasm for the bomb. Ayub reportedly said that,

‘We will buy the bomb off the shelf if India goes nuclear,’³ but his foreign minister, Zulfikar Ali Bhutto knew that doing such a thing was impossible. Bhutto, a brilliant politician who appealed to anti-Indian sentiment, had for long aspired for the bomb. In 1966 he wrote that, ‘It would be dangerous to plan for less and our plans should, therefore, include the nuclear deterrent.’⁴ Five years later Pakistan was decisively defeated by India whose military intervention tipped the balance in the bloody civil war between East and West Pakistan. Bangladesh emerged, leaving the ‘Two-Nation Theory’—the basis on which Pakistan had come into existence—in tatters.

Serious, but still preliminary, thinking about the bomb began in 1972, a year after the crushing blow of defeat in the Indo-Pak War of 1971 which led to the break-up of Pakistan and the creation of Bangladesh. In the city of Multan, an emotionally charged Bhutto, now prime minister, called a meeting on 20 January 1972 to which senior scientists and engineers were invited. Bhutto exhorted them to build the bomb, fired the existing chairman of the Pakistan Atomic Energy Commission, Dr Ishrat Hussain Usmani and hired an ambitious new one, Munir Ahmad Khan.

But 1972 was still not the actual starting point for Pakistan’s quest for the bomb although Indian analysts often justify acquisition of their bomb by pointing fingers at Pakistan. According to some of my senior physics colleagues present at that meeting—including Dr Riazuddin, who later received a high Pakistani award for being the bomb’s chief theoretician—there were no clear ideas of what it took to make a bomb and what had to be done. But just two years later the shock waves from India’s nuclear test hit Pakistan, which had now been reduced to half its former size.

An all-out ‘Manhattan-style’ effort in Pakistan began just days later.^{5,6,7} Bhutto raised money from Arab states such as Libya and Saudi Arabia. It is rumoured that bales full of dollars were brought in on Pakistan International Airline flights from the Middle East. Funds donated for helping the victims of the 1974 earthquake that hit the Karakoram Mountains are alleged to have been diverted into the nuclear program. Those who knew the precise details, like

Ghulam Ishaq Khan and H.U. Beg, took these secrets to their graves. The truth shall never be known.

Bhutto also elicited crucial nuclear help from China. Alarmed at India's nuclear success, China was willing to share the designs of its first weapon with Pakistan. This bomb had first been tested in Lop Nur in 1964.⁸ China had also allegedly supplied UF₆ (uranium hexafluoride) gas for testing the centrifuges before a UF₆ plant was secretly imported from Germany.⁹ This gas is the raw material from which the bomb material is ultimately extracted. It is quite likely that the development of nuclear weapons by Pakistan would have eventually succeeded, but without Chinese assistance this would have taken longer.

Some details about Chinese involvement have been confirmed by Dr A.Q. Khan, the metallurgist who headed the uranium enrichment plant at Kahuta and is famed for having brought back centrifuge designs from his earlier employment at URENCO in Belgium. Publically disgraced in January 2004 after his global business enterprise of selling nuclear technology surfaced, he was put under house arrest but still succeeded in giving interviews. In a dejected moment he revealed that China had supplied 50 kilograms of highly enriched uranium together with a blueprint for a simple weapon that China had already tested, thus supplying a virtual do-it-yourself kit.¹⁰ But Khan, who has launched his own political party and is now aspiring to becoming the president of Pakistan, says that Pakistan was not a passive recipient. He says that the traffic was both ways and Pakistani experts were dispatched to Hanzhong in central China, where they helped 'put up a centrifuge plant' and that, 'We sent 135 C-130 plane-loads of machines, inverters, valves, flow meters, pressure gauges. . . . Our teams stayed there for weeks to help and their teams stayed here for weeks at a time.'¹¹

That China tested for Pakistan its first bomb in 1990 has been claimed in a recent book co-authored by former U.S. Air Force Secretary Thomas Reed. Reed had earlier worked at Livermore National Laboratory as a weapons designer.¹² According to Reed, the Chinese did a massive training of Pakistani scientists, brought them

to China for lectures, and even gave them the design of the CHIC-4 device, which was a weapon that was easy to build a model for export. Together with the other author, Danny Stillman, who was director of the technical intelligence division at Los Alamos National Laboratory, Reed argues that the reason Pakistan could respond so quickly and confidently after the Indian tests was because it was already tested in 1990, eight years before the tit-for-tat tests. Pakistani weaponeers vigorously deny this.

By 1986, or possibly a year earlier, Pakistan had some form of weapon. Delivery capability came some years later but, of course, preparations for testing could be made independently. A team headed by Dr Samar Mubarakmand was put in charge of preparing nuclear test sites at Chaghai and Koh Ras. And so, just seventeen days after the Indian tests, on 28 May 1998, the Chaghai mountains in Balochistan turned white from five nearly simultaneous atomic blasts. Prime Minister Nawaz Sharif had initially been hesitant because he feared crippling sanctions but finally decided to cross the bridge.¹³ To jubilant crowds he announced: 'Today we have settled scores with India by detonating five nuclear devices of our own. We have paid them back.'¹⁴

While Nawaz Sharif claimed credit, so did his arch-rival and opposition leader, Benazir Bhutto. Before Pakistan tested she demanded that the U.S. should bomb India. In an article published in the *Los Angeles Times*, she wrote: 'Rogue nations that defy world opinion ought to be taught a lesson,' and hence, 'If a pre-emptive military strike is possible to neutralize India's nuclear capability, that is the response that is necessary.'¹⁵ Addressing a public rally she made a grand theatrical gesture, tossing her glass bangles on the ground and taunting Nawaz Sharif that he was a *na-mard*, i.e., not man enough to respond to India's nuclear provocation. Thereafter, whatever restraining doubts Sharif might have had quickly vanished.

Pakistan's initially reluctant political leaders now feasted on their new-found glory. Massive celebrations, organized as well as spontaneous, erupted across Pakistan. Celebrations on the West Bank, and in some Muslim countries, broke out. The bomb makers

became celebrities; school children were handed free badges with mushroom clouds; and poetry competitions extolled the great national achievement. Missile and fibreglass replicas of the nuclear test site mushroomed across the country. Most were removed several years later but some still stand in Pakistan's public squares and at crossroads. They are testimony to the delirium that had overpowered the country at a time when, for the man on the street, they stood as symbols of national glory and achievement rather than instruments of wholesale death and destruction.

The exhilaration overpowered the rational sensibilities of national leaders, both military and civil. Soon Pakistan was to see nuclear weapons as a talisman, able to ward off all dangers. Countering India's nuclear weapons with Pakistani nuclear weapons became secondary. Instead, the latter became the means for neutralizing India's far larger conventional land, air, and sea forces. Size no longer mattered. Zulfikar Ali Bhutto's dream of avenging East Pakistan, and of liberating Kashmir, now seemed to lie within the realm of possibilities.

EVOLUTION OF PAKISTAN'S NUCLEAR POSTURE

Although India's nuclear weapons had been conceived primarily as a means to counter China and fulfil notions of national grandeur, they inevitably created new dynamics of hostility in Pakistan–India relations. A fearful Pakistan originally acquired its own weapons largely for a single purpose: that of balancing every Indian nuke with a Pakistani nuke, or as close to that as possible. At one level this is understandable; living with a nuclear neighbour—especially an unfriendly one—cannot ever be comfortable for any country.

But the goal post was soon to shift. As early as 1966, just after 'Operation Gibraltar' had failed to reach its objectives, Bhutto had wanted the bomb as a deterrent that would work even if Pakistan was to be proactive again in Kashmir. Now, after their successful 1998 nuclear tests, Pakistani generals instantly saw that the calculus of power had changed in their favour. The NATO–Warsaw Pact experience had already established that parity could be obtained even

with a much larger conventional force on the other side. So the fact that India had 1.3 million personnel in military uniforms, and Pakistan had only 0.6 million mattered much less. Now nuclear weapons could be used for more than just a boring stand-off with India. Convinced of an impregnable defense, Pakistani military planners embarked on what they thought was a brilliant covert operation in Kashmir.

Just months after Pakistan had established its nuclear credentials, the Chief of Army Staff, General Pervez Musharraf, sent troops out of uniform along with Islamist militant fighters across the Line of Control (LoC) in Kashmir. They seized strategic positions in the high mountains of the Kargil area on the Indian-controlled side in early 1999, setting off a war that left approximately two to four thousand personnel dead on both sides. Arguably, it was the first war in history to have been caused by nuclear weapons; the belief that Pakistan now possessed an impregnable defense meant that it could take much bigger risks against a superior military adversary.

To Pakistan's surprise (what truly surprises is that its leaders were surprised!) India poured troops and artillery into Kargil and vigorously counter-attacked once it realized the seriousness of the secret invasion. A military disaster for Pakistan loomed ahead and, worse, it stood diplomatically isolated.^{16,17} With a tense situation threatening to spiral into all-out war, western diplomacy went into overdrive. Gloomy and worried, Prime Minister Nawaz Sharif contacted the Americans. But even before he flew to Washington on 4 July 1999, he had been bluntly told to withdraw Pakistani forces or be prepared for full-scale war with India. Bruce Reidel, Special Assistant to President Clinton, writes that he was present in person when Clinton informed Nawaz Sharif that the Pakistan Army had mobilized its nuclear-tipped missile fleet.¹⁸ (If this is true, then the preparations for nuclear deployment and possible use could only have been ordered by General Pervez Musharraf at either his own initiative or in consultation with the army leadership.)

Riedel writes:

Was that what Sharif wanted, Clinton asked? Did Sharif order the Pakistani nuclear missile force to prepare for action? Did he realize how crazy that was? You've put me in the middle today, set the U.S. up to fail and I won't let it happen. Pakistan is messing with nuclear war. Sharif was getting exhausted. He denied that he had ordered the preparation of their missile force, said he was against that but he was worried for his life now back in Pakistan.¹⁹

Unnerved by Clinton's revelation and the closeness to disaster, Nawaz Sharif agreed to immediate withdrawal, abandoning earlier assertions that Pakistan's army had no control over the invaders. The order to retreat was to poison relations between him and Musharraf, leading to Sharif's ouster just months later, on 12 October 1999. However, contrary to claims that he made a decade later, Sharif had not opposed the venture. While he may not have been fully on board, television footage shows him visiting forward army posts near the Kargil area where he had given rousing speeches to soldiers.²⁰

One does not know if there was any actual move towards readying nuclear forces on either side; this will be forever debated and disputed. But even if there had been none, Kargil had impacted strategic behaviour in the subcontinent in a significant manner. Timothy Hoyt, writing on the nuclear dimensions of Kargil, puts it as follows:

Prior to Kargil, Indian and Pakistani elites viewed their nuclear capabilities as largely political, rather than military tools, and assumed that they would stabilize their longstanding competition. Leaders of each country made assumptions about the impact nuclear arsenals would have on the other side's behaviour, but these assumptions were mutually contradictory, and ultimately failed to account for the attitudes and responses of the other side. As a result, nuclear weapons did not deter war.²¹

Despite the Kargil defeat, Pakistan political and military leaders insisted that Pakistan had prevailed in the conflict and that its nuclear weapons had deterred India from crossing the Line of Control or the international border. The information minister, Mushahid Hussain, claimed that the Indian forces had been given a sound drubbing.²² This belief still exists in the military, which is reluctant to admit that the philosophy behind the Kargil invasion was flawed. Internationally, Pakistan was branded the aggressor. The conflict eventually wound down after Pakistan ordered the withdrawal of its forces.

After Kargil, it did not take long to get back to the brink. On 13 December 2001, Islamic militants based in Pakistan struck at the Indian parliament in Delhi, sparking off a crisis that lasted for about seven months. While it is probably true that Musharraf's government did not order, and was unaware of the planned attack, there is little doubt that a free hand had been given to jihadists in Pakistan-controlled Kashmir. Indian tempers soared again. Prime Minister Atal Bihari Vajpayee exhorted his troops in Kashmir to prepare for sacrifices and 'decisive victory'. This set off widespread alarm. It seemed plausible that India was preparing for a 'limited war' to flush out Islamic militant camps in Pakistan-administered Kashmir. That nuclear weapons were put on enhanced alert by both sides is a strong possibility, although, direct proof appears unavailable.

Tensions kept mounting during the stand-off. Sensing a global climate deeply hostile to Islamic militancy after the 11 September 2001 attack on New York's World Trade Centre, India's ruling BJP echoed the 'War on Terror' slogan as a way to garner international support for their military campaign in Kashmir. In response, Pakistan's ambassador to the U.N. in Geneva, Munir Akram, sent a threatening message by reiterating Pakistan's refusal of a no-first-use policy. He said that given India's armed forces are larger than Pakistan's; anyone asking Pakistan to rule out first-strike of nuclear weapons would be 'asking us in fact to accept the use of conventional force by India.'²³

Indian aggressiveness was also on full display. Defense Minister George Fernandes told the *International Herald Tribune*: 'India can survive a nuclear attack, but Pakistan cannot.'²⁴ Indian Defense Secretary Yogendra Narain took matters a step further in an interview with *Outlook Magazine*: 'A surgical strike is the answer,' adding that if this failed to resolve issues, 'We must be prepared for total mutual destruction.'²⁵ Indian security analyst, Brahma Chellaney, claimed: 'India can hit any nook and corner of Pakistan and is fully prepared to call Pakistan's nuclear bluff.'²⁶ Fortunately, good sense prevailed and once again international mediation helped wind tensions down after a tense, months-long standoff.

Then came the Mumbai massacre. Carried out by over 30 Pakistan-based attackers, it began on 26 November 2008 and lasted three days, killing 164 and wounding at least 308. This incident is considered as their 9/11 by Indians. In the first few days, it seemed that the Pakistani state, embattled as it was by other jihadist groups it was fighting, could not have ordered the attacks. With the revelations of David Headley, a Chicago-based Pakistani-American who was working with an ISI operative, the situation has become murkier. It appears that parts of the Pakistani establishment might have been involved without knowledge of those at the top. Between 2006 and 2008, Headley admitted to performing five spying missions in Mumbai scouting targets for the 2008 attacks, on behalf of Lashkar-e-Taiba and Pakistani ex-military officers. Indian temperatures soared when Pakistan vociferously denied that its nationals were involved—a manifest untruth after the capture of Ajmal Kasab belonging to Faridkot, Pakistan. The media in both countries poured fuel over the fire, with Indian television anchor persons repeatedly calling for military action against Pakistan. Tensions simmered for long, dying away only gradually.

As of 2012, the Pakistani government has not acted against the Mumbai perpetrators. Hafiz Saeed roams the land, exonerated by Pakistani courts, delivering fiery speeches against India and the U.S. Indian allegations of Pakistan's official involvement became more pointed after the capture of Abu Jindal in June 2012; the Indians

described the event as hitting a gold mine which proves official involvement through the ISI. Pakistan routinely denied the charges.

A POSSIBLE CRISIS ESCALATION LADDER

Now let's suppose that Mumbai-II were to happen and tensions were once again to rise to some dizzying level. What are possible Pakistani responses to an Operation Parakram, Cold Start, or some similar operation designed to punish Pakistan? One can imagine the following rungs of escalation each leading to the one above, or perhaps, even skipping to the next one:

1. Strong statements by the Pakistan Army and political leaders, similar to those made during previous crises, with open threats that a nuclear showdown is imminent.
2. Mobilization of a few missiles and nuclear-capable aircraft. This would be detectable by India's RISAT's (Radar Imaging Satellite) which, while in a 540-mile high orbit, uses a synthetic aperture that gives it day-night all-weather reconnaissance capability.²⁷ Thereafter one expects India to respond with a similar mobilization. But Pakistan would have to rely on China for intelligence information as it does not have such satellite capability.
3. An underground nuclear test by Pakistan. This would be a powerful signal that nuclear temperatures have sharply increased. Such a test is certainly technically possible, and one presumes that Pakistan has already prepared an appropriate site (probably again in Balochistan). Since Pakistan has not signed the CTBT (Comprehensive Nuclear Test Ban Treaty), this would not violate any international law. The Indian response could be tit-for-tat: those Indian scientists long spoiling for a chance to fine-tune their thermonuclear weapons will have their wish fulfilled.²⁸
4. Air-dropping a bomb on some uninhabited desert area within Pakistan. The psychological impact would be enormously larger than that of an underground test; the flash would be detected by

aircraft and satellites, and the mushroom cloud would carry radioactivity long distances in directions determined by winds prevailing at that time. The fact that even desert areas are not completely uninhabited would be a consideration, but would not rule out this option. It is unlikely that India would follow suit (although underground testing will remain an option). Pakistan's action would arguably not be a violation of any NFU (No First Use) principle.²⁹ However, massive alarm would be created by this action and Pakistan might be seen to have nuclearized the conflict. Thereupon India would seek to have a total international boycott imposed upon Pakistan.

5. Use of tactical nuclear weapons against invading Indian troops. The development of short-range battlefield nuclear weapons such as *Nasr* and *Abdali* suggests that Pakistani planners have accepted this as a plausible scenario and thus worth preparing for. A Pakistani Inter-Services Public Relations (ISPR) press release in May 2012 stated: '*Nasr*, with a range of 60 km, carries nuclear warheads of appropriate yield with high accuracy, shoot and scoot attributes. This quick response system addresses the need to deter evolving threats.'³⁰ The Indian response to a TNW attack could be: a) An all-out attack using conventional weapons and a sea-embargo of Pakistani ports; b) A demonstrative nuclear attack on some military target within Pakistan. If the latter, then there would be a real question of whether further escalation can be limited.

Although much is made of TNW's, they may not be very effective militarily—invading front-line combat units can be expected to be sufficiently well dispersed and mobile so as to not make good nuclear targets.³¹ Moreover, the sub-kiloton warheads are expensive: in spite of a yield 10–15 times lower than a 'city-buster', they consume 3–4 times more fissile material. This fact could be important for a country that has limited fissile stocks. But the very fact that nuclear weapons were used—even if on Pakistani soil rather than Indian—would have broken a taboo and brought the

danger level to the very highest level; cities on both sides would now stand in mortal danger.

After the first weapon has been used, can anything be done to prevent catastrophe and prevent all available ones from being used? Given the extreme passions that would then rage, it is difficult to be optimistic. But, anticipating that such a situation could arise, in these calmer times, India and Pakistan would do well to give some thought to the management of a nuclear conflict should it start, for whatever reason.

At the very least both countries need to declare a policy of proportionate response. Rather than deliberately cultivating a 'madman image', it is better to go for 'an eye for an eye, a tooth for a tooth' policy. For this reason, nuclear crisis diplomacy must be kept alive. If India–Pak communication breaks down at some point in a crisis, third-party interlocution is going to be vital for averting a disaster. This is a complex issue. Until Musharraf's departure, Pakistan's nuclear program has been relatively transparent to the U.S., although, India's had been relatively opaque. Pakistan had an abiding faith in the U.S. to keep the Pak–India conflict from getting out of control in spite of the fact that the U.S. did not come to its aid in the 1965 and 1971 wars. India, on the other hand, had long presumed that the U.S. would give primacy to Pakistan and so distrusted it. But events over the last two decades have moved India towards, and Pakistan away from the U.S. While this reduces the importance of U.S. diplomacy in mediating conflicts, it still remains the best option.

Who would make nuclear decisions on the Pakistani side and according to what procedure? Opacity is part of the strategy of every nuclear state, and so no definitive answer can be given. But some facts seem well established. While General Musharraf was simultaneously President and Chief of Army Staff, he was the central person. The Strategic Plans Division (SPD) was created on his orders in February 2000, and became the sole organization authorised to have custody of nuclear weapons. It was overseen by the Nuclear Command Authority (NCA) whose members were the President,

Prime Minister of Pakistan (Vice Chairman), Minister for Foreign Affairs; Minister for Defense; Minister for Finance; Minister for Interior; Chairman, Joint Chiefs of Staff Committee; Chief of Army Staff; Chief of Naval Staff; and the Chief of Air Staff. The Director General (DG) of SPD, Gen. Khalid Kidwai, was the NCA's Secretary. Kidwai was set to retire in 2006, but Musharraf gave him a one-year extension, reportedly because of his technical assignment; he remains DG as of the end of 2012.

Post-Musharraf, it became clear that the army had little patience for the civilian leadership, especially in nuclear affairs. In November 2009, President Asif Ali Zardari quit his position as the NCA chairman, transferring his powers to Prime Minister Yousuf Raza Gilani. One expects that these powers were transferred on to Raja Pervez Ashraf, his replacement. Of course, no one really believes that Pakistan's civilian governments have any substantial control over nuclear matters.

IS NUCLEAR DETERRENCE ROBUST?

The rhetoric during each new Pakistan–India crisis has been fierce, suggesting a lessening of political restraints and ever greater nuclear brinkmanship. During earlier crises, high-ranking Indian officials conveyed publicly what they believed to be a powerfully convincing deterrent message—one that Rawalpindi took all too seriously. For example, during the 2001–2002 ‘Twin Peaks’ crisis, Defense Minister George Fernandes famously responded to belligerent Pakistani statements in this manner: ‘We could take a strike, survive, and then hit back. Pakistan would be finished.’ During this crisis, the President of the ruling Bharatiya Janata Party, Jana Krishnamurthy, issued the same warning: If Pakistan escalated to nuclear weapons’ use, ‘its existence itself would be wiped out of the world map.’ The Indian Chief of Army Staff, S. Padmanabhan, sang the same tune—that if Pakistan resorted to first use, ‘the perpetrator of that particular outrage shall be punished so severely that their continuation thereafter in any form will be doubtful.’

Various Indian strategic analysts have also echoed this deterrent threat. For example, Bharat Karnad says that the problem 'is not one of preventing nuclear war, but with believing that Pakistan can annihilate India, which is not possible, even as the reverse is eminently true.'³² Gurmeet Kanwal asserted that, 'if Pakistan were to . . . resort to the unthinkable, then India might as well insure that Pakistan finally ceases to exist as a nation state. . . . In an imperfect world . . . it does not pay to be squeamish.'³³

Nonetheless, in spite of such pronouncements, there been no actual use of nuclear weapons since Hiroshima and Nagasaki. Although Pakistan and India have viciously clawed at each other, each time they have stepped back from the brink. Doesn't this constitute proof that deterrence 'works'? On the face of it, the answer is 'yes'. But what has worked a few times might, or might not work the next time. Repeated cycles increase fear-fatigue, reducing the value of deterrence. Indeed, the efficacy of nuclear deterrence rests upon the ability of these weapons to induce terror. It also presupposes a rational calculus, as well as actors who, at the height of tension, will give primacy to logic over emotion. Events in South Asia have put these assumptions into question. Countries loitering close to the brink may begin to feel that they cannot fall into it.

The conflict in early 2002, which came in the background of crises in 1977 and 1990, showed a remarkable public indifference to the tense situation on the ground. A million troops had mobilized and leaders in both India and Pakistan threatened nuclear war. World opinion responded fearfully seeing a fierce, possibly suicidal, struggle up ahead. Foreign nationals streamed out of both countries. But even at the peak of the crisis, few Indians or Pakistanis lost much sleep. Stock markets flickered, but there was no run on the banks or panic buying. Schools and colleges, which generally close at the first hint of disturbances, functioned normally. The indifference to nuclear annihilation shocked the rest of the world.

The nonchalance has a strong reason. India and Pakistan are still largely traditional, rural societies, albeit undergoing rapid economic and social transformation. The fundamental belief structures of such

societies (which may well be the last things to change), reflect the realities of agricultural economies dependent on rains and good weather—precisely the factors that brought the Rain God and other deities into being. These pre-scientific beliefs encourage surrender to larger, supernatural forces. Conversations and discussions often end with remarks to the effect that fate shall triumph, or that it shall be as Allah wills, after which people shrug their shoulders and move on. Risk-taking is natural once unseen forces can be brought to your defense.

Nuclear ignorance partially explains this cavalier attitude. In either country, most people lack any real understanding of the catastrophe that would follow the use of even a single, small 15KT nuclear weapon in a populated area. In India, a November 1999 post-election national opinion poll survey found just over half of the population had not even heard of the May 1998 nuclear tests.³⁴ In the middle of the spring 2002 crisis, the BBC reported the level of awareness of the nuclear risk among the Pakistani public was ‘abysmally low’.³⁵ In India, it found ‘for many, the terror of a nuclear conflict is hard to imagine.’³⁶

First-hand evidence bears out these judgments. Even educated people seem unable to grasp basic nuclear realities. Some physics students (and faculty!) in my university’s physics department think that a nuclear war would be the end of the world. Others see nuclear weapons as just bigger bombs. Many said it was not their concern, but the army’s. Almost none know about the possibility of a nuclear firestorm, about residual radioactivity, or damage to the gene pool. The media has not attempted to change the public’s ignorance of nuclear dangers. Critical discussions of nuclear weapons and nuclear war are strictly off limits in both countries.

Terror of nuclear weapons was fundamental in moving the Cold War adversaries towards nuclear treaties such as SALT (Strategic Arms Limitation Talks), and the winding down of their aggressive military posturing. But this feeling of fear is not to be found in the Pakistan–India nuclear situation. Instead, oftentimes one finds a casual denial of reality and an almost blasé indifference to what

nuclear weapons do. This means that military and civil leaders are not constrained from hurling belligerent threats or taking rash actions.

Pakistani political leaders and analysts are also remarkably ignorant of nuclear matters. It is well known that Benazir Bhutto was kept out of the nuclear loop. Knowing how difficult it would be to persuade the generals, she displayed no desire to be informed of nuclear secrets, much less challenge the generals over whom she supposedly had authority.³⁷ President Asif Ali Zardari, after a faux pas in which he said Pakistan believed in NFU (No First Use) of nuclear weapons, quickly resigned from presiding over the nuclear command authority and delegated his authority to the prime minister.³⁸

On the Indian side, serious misconceptions about Pakistan's capabilities prevailed even after the 1998 nuclear tests. Even later, several senior Indian military and political leaders continued to express doubts on the operational capability and usability of the Pakistani arsenal. As detailed earlier, after Pakistan's incursion into Kargil, India began to seriously consider making cross-border strikes on militant camps on the Pakistani side of the Line of Control. This gained support in Indian ruling circles, increasing risks of a mis-judgment that could have led to serious miscalculations.

Many Indians have also held the false belief that Pakistan, as a client state of the U.S., had been forced to put its nuclear weapons under the control of the U.S. Thus the U.S. would either restrain their use by Pakistan or, if need be, destroy them. At a meeting in Dubai which I attended in January 2002, senior Indian analysts said they were 'bored' with Pakistan's nuclear threats and no longer believed them. K. Subrahmanyam, an influential Indian hawk who has long advocated Indian nuclearization said that India can 'sleep in peace'. Although the current tension between the U.S. and Pakistan puzzles various Indian commentators, such beliefs continue to be held by many Indians—including those in high positions.

The presumption is misplaced. Even if the United States had the political will it would not have the capability to locate and destroy

Pakistani nuclear weapons. To faithfully track even a handful of mobile nuclear-armed missiles is extremely difficult. During the Cuban missile crisis, the U.S. Air Force had aerial photos of the Soviet missile locations and its planes were only minutes away, yet it would not assure that a surprise attack would be more than 90 per cent effective. In the first Gulf War, U.S. efforts to destroy Iraqi Scuds had limited success. For all the talk and threats issued from time to time, the U.S. is extremely reluctant to move on Iran's nuclear weapons—or allow Israel to go for them. No country has ever tried to take out another's nuclear bombs. The consequences of a botched operation can be severe.

HOW MANY ARE ENOUGH?

The number of nuclear weapons that Pakistan 'must have' is generally left open by defense analysts; it is rare to find explicit numbers. It is therefore of some interest to consider the figures used by a retired Pakistani air force officer, Air Commodore Jamal Hasan.³⁹ His logic is reproduced below.

We assume that destruction of two enemy cities will meet our minimum deterrence needs and each city would need to be hit with five nuclear bombs, that our delivery means have a 50% probability of successfully penetrating the enemy defenses, and finally the enemy has the capability of destroying 50% of our nuclear assets in a pre-emptive first strike. Now with these sets of assumed determinants, the number of weapons needed to ensure minimum deterrence would be:

- * Number of bombs required to take out two cities @ 5 per city: 10 bombs
- * After factoring in enemy's 50% intercept capability: 20 bombs
- * Enemy can take out 50% of our force in a pre-emptive strike. So we would need 40 bombs to maintain our minimum deterrence under the given set of assumptions.

This relatively modest figure of 40 bombs then jumps to a staggering 1000 under a different set of assumptions made by the same writer:

Let us now assume that the enemy has enhanced his offensive and defensive capability. Now, he can intercept 90% of our nuclear weapons because of better NMD system. He also has increased his offensive potential through greater number of nuclear weapons with enhanced accuracy and now can take out 90% of our nuclear arsenal in a pre-emptive strike. Now the fresh calculation would be:

* Number of bombs required to take out 2 cities @ 5 per city: 10 bombs

* After factoring in enemy's 90% intercept capabilities: 100 bombs

* After factoring in 90% of enemy's riposte capability: 1000 bombs⁴⁰

A degenerative logic is apparent above. Tweaking input parameters arbitrarily generates arbitrary outputs—you can get the result you want, and yet it can be made to appear as the end product of a logical process.

Similar leaps of logic can be found on the Indian side. Like Pakistan, India refuses to set an upper limit on its arsenal. Instead, it enhances Pakistani fears by claiming advances on its side. DRDO's announcement⁴¹ in 2012 that 'Delhi and Mumbai, the two most vital metros of India, have been chosen for ballistic missile defense shield' feeds into Pakistani fears, although, this gives incentive to Pakistan to step up its warhead production, the missile shield gives little real protection.

In the context of South Asia, missile defense is a technical impossibility because of extremely short 4 to 6 minute warning times, easily manufactured decoys, and various electronic counter measures. To attack with missiles is relatively easy but to defend specific targets against missiles in the mid-course and terminal phase is very hard. A report of the American Physical Society says that destroying missiles in even the (much easier) boost phase is dauntingly difficult.⁴²

Nevertheless, the Indian establishment's security paradigm has not shifted fundamentally and more Indian missiles are on their way. Marking a quantum escalation, in July 2009, India began sea trials of its 7000-ton nuclear-powered submarine, the *Arihant*, with underwater ballistic missile launch capability. The submarine is the

first in a planned fleet of five, and is to be supplemented by a hunter-killer nuclear submarine soon. While the *Arihant* is not yet operational, DRDO has claimed a recent success: after the maiden test of the 5000 km *Agni V*, DRDO's head, V.K. Saraswat, noted that several *Agni* variants could eventually be mated with multiple independently targetable re-entry vehicles (MIRVs), or multiple nuclear warheads. On 10 May 2012 he explained: 'Where I was using four missiles, I may use only one missile. So it becomes a force multiplier given the damage potential.'⁴³

A booming Indian economy has fed India's rapid militarization. With only a sixth of India's budget, Pakistan obviously cannot match India weapon-for-weapon. Nevertheless, historically every Indian move somehow finds a counter move. Predictably, news of India's new weapon systems is badly received in Pakistan. What should it do? Tariq Osman Hyder, a former diplomat who headed Pakistan's delegation in 2004–2007 talks with India on nuclear and conventional CBMs, gave his answer:

What should Pakistan do? First of all develop its own second strike nuclear submarine based capability on which it must have given some thought having been long aware of the Indian program. Secondly, equip its conventional submarines with nuclear-tipped cruise missiles. Thirdly, as the Russian assistance to India for this project, and the lack of any objection from the U.S. or any other party has shown that both leasing of nuclear submarines and technology for their production are completely compatible with the global non-proliferation regime, Pakistan should explore such possibilities.⁴⁴

The long and short is that the Pakistan–India nuclear race is open-ended; the sky is the limit. Of course, this is not particular to the subcontinent. Escalation lies in the nature of the nuclear beast: the Cold War saw the U.S. warhead-count reach a peak of 31,255 in 1967.⁴⁵ Just one of these bombs—even one on the smaller side—dropped on a city can easily kill a hundred thousand and the fallout would render the city uninhabitable for years.

Praful Bidwai, an astute observer of the Indian nuclear scene, sums up South Asia's current situation as follows: 'Today, both countries refuse to restrict themselves to any specific number of weapons. Similarly, for delivery vehicles and 'flexible response' is kept undefined. Tactical nuclear war-fighting, once considered escalatory and way beyond minimal deterrence, is said to have been incorporated into current Indian military doctrine. . . . Taken together, Indian military options and Pakistani planning would seem to ensure that that any major India–Pakistan conflict would inexorably lead to the use of nuclear weapons.'⁴⁶

Perhaps it might be slightly more scientific to insert 'likely' instead of 'inexorably' in Bidwai's sobering assessment. But then, that's only a quibble.

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