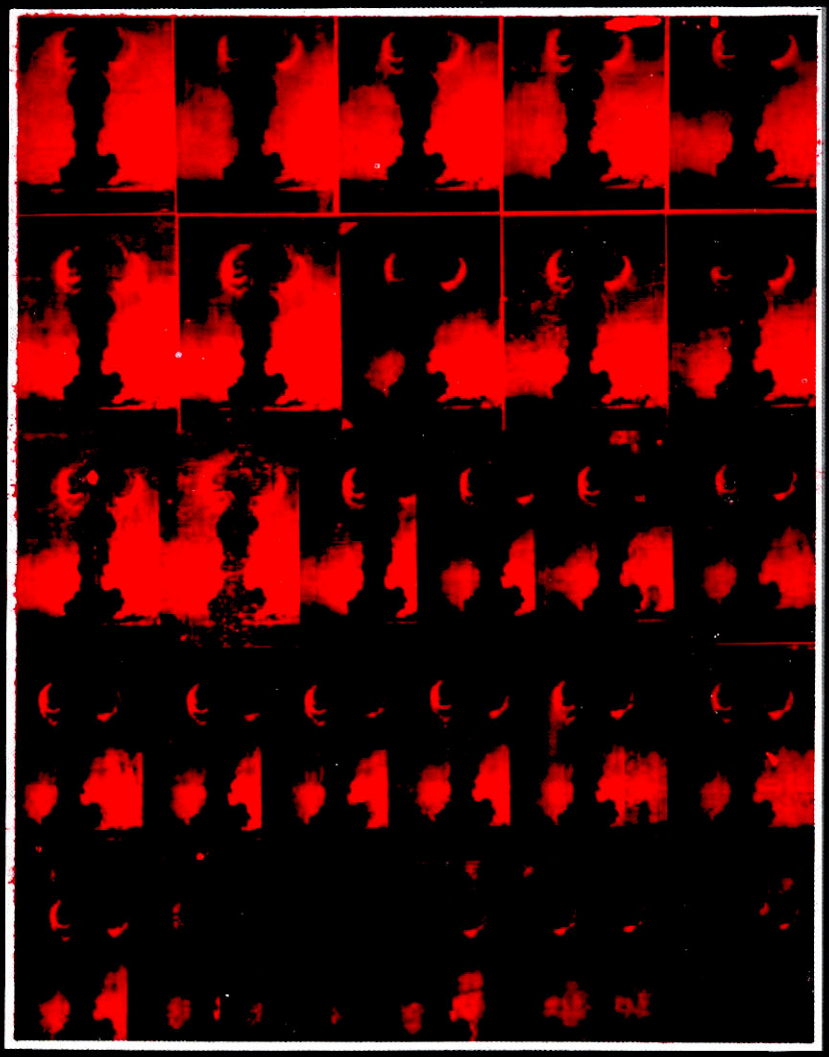
PAKISTAN'S ATOMIC BOMB & THE SEARCH FOR SECURITY

Edited By : ZIA MIAN



Pakistan's Atomic Bomb And The Search For Security

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There is Gautam Publishers, who have taken the risk when others have not.

The greatest debts are, as always, personal. They are rarely mentioned, can never be paid, and payment is never asked for. It is enough that they are remembered.

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Foreword

Many in Pakistan believe that the only way to meet the military threat posed by India is to possess nuclear weapons. Pakistan is smaller than India. Pakistan cannot match the resources of India. Should that country continue to augment its armed might in conventional weapons at the rate it has been doing, Pakistan shall ultimately be rendered vulnerable. They argue that possession of nuclear weapons by the United States and former Soviet Union prevented a war between them. Possession of nuclear weapons by India as well as Pakistan shall also prevent a war between the two. In the following pages, the learned authors rightly put forward a contrary point of view on which Pakistanis seriously need to ponder. And there is more to support their arguments.

In classical strategic theory, the aim of war was simply stated: to disarm the enemy. That is, to disarm the fighting power of the adversary. Once that aim was achieved the vanquished populace, and its resources, lay at the mercy of the victor, to dominate, to exploit, even to annex. After the coming into being of modern nation states and the easy availability of lethal weapons for citizens, it is no longer feasible through war to 'disarm' the enemy. The people in a contemporary nation state, who comprise the 'enemy' are armed, and shall remain capable, for an indefinite period, to fight any power they consider an aggressor.

Further, as the twentieth century draws to a close it is no longer possible for any country to keep in its possession for long any piece of a territory of another country. The international community shall not let that happen. Even tiny nation states can now exist as stable unconquerable entities next to much larger and militarily powerful neighbours. Thus war is no longer capable of producing any positive political results except the ruination of both combatants.

For far too long war has been considered politics by 'other means'. This doctrine is no longer applicable even in the Third world where some nations still face, among others, a crisis of identity. Korea, Cuba, Vietnam, Kampuchea, aggressions by Israel, wars in Lebanon, Africa and South and Central America, Iraq-Iran war, Afghanistan, the recent war against Kuwait and then against Iraq, three wars between India and Pakistan and in some ways even the total victory of the 'Allies' over the Axis powers failed to achieve the aims over which the aggressors and the victim of aggression had collided. As time passed, total wars, 'limited wars', 'proxy wars' and other forms of large scale organised violence have proved futile. Indeed, as the dawn of the next millennium draws near, war has become obsolete. Its classical aims are un-achievable.

For the past forty-eight years India and Pakistan have wrongly considered war as a viable option in the conduct of their foreign policy, or for the solution of their disputes. In order to achieve their foreign policy objectives they first indulged in an arms race of conventional weapons that their treasuries could ill-afford. And today they militarily face each other as threshold nuclear weapon-states.

It is astounding how otherwise sane and sensible people can succumb to the arguments of achieving victory in the field of battle, as if by magic - through the possession of an atom bomb. Little do the war mongers on both sides of the India - Pakistan border realise how utterly useless and devastating a war, any war, between the two shall be. How can nations which cannot disarm political militants within their own borders think of capturing through war a piece of territory of the other country and holding on to it for any length of time. The option of settlement of disputes through waging a war, much less by nuclear exchange, between India and Pakistan is bad politics, bad economics and sheer immorality.

Mubashir Hasan

Lahore: 10 March, 1995

Introduction

Shall we, instead, choose death, because we cannot forget our quarrels? Remember your humanity, and forget the rest. (The Einstein - Russell Manifesto)

The nuclear age opened fifty years ago with a blinding light, a deafening roar, fire, and blood. On August 6th 1945, the United States first used their new nuclear weapon, and brought death to the people of Hiroshima. They used it again three days later, and the people of Nagasaki died. Despite suggestions that the bomb be exploded in some uninhabited place, with the Japanese invited to witness its awesome destructive power, the US taught the world the first lesson of the new age, the nuclear bomb is there to be used.

The Soviet Union, seeing and fearing what the US had wrought, followed in its footsteps across the nuclear threshold, and the world also learnt of a new kind of war, Cold War. No armies clashed, no bombs dropped, no missiles fired, but it was war. And they said nuclear weapons were keeping the peace.

To keep this peace one bomb was not enough, nor were ten, nor a hundred, nor a thousand. For decades humanity watched the "arms race", watched as the superpowers accumulated ever greater numbers of ever more deadly nuclear weapons. The bomb had created a system to reproduce itself. This was the second lesson of the nuclear age.

No one has described this better than E. P. Thompson, the English socialist, peace campaigner, and historian : "the armourers excite the other's armourers, the hawks feed the hawks, the ideologists rant at each other like rival auctioneers, and the missiles copulate with each other, and breed on each others' foul bodies the next generation of missiles."

Eventually, for all kinds of reasons, the system collapsed under its own stresses. But it was not the bomb that failed, it was people. Some could no longer feed the insatiable monster that was supposed to be protecting them, others just lost their fear of the "enemy". Many began to protest against living their lives in fear of nuclear destruction. They protested so that they could survive, and the number of nuclear weapons started to fall.

The drift in South Asia has been in the other direction. For nearly fifty years India and Pakistan have known little but hostility and war. Equating national security with military security has meant that their armies keep growing in size, and there are weapons of every kind, and each year there have to be more and newer weapons, and so the insecurity grows. The date that the bomb arrived here can be set at May 1974, when India tested a nuclear weapon. This explosion, coming after decades of animosity, three wars, and fear of the future, hastened something that seemed bound to happen. Following the pattern of the superpower arms race, where what one

state had was desired and acquired by the other, Pakistan claims that, now, it too has the capability to make and use nuclear weapons.

While both countries have stopped short of actually deploying nuclear weapons, the threat that they pose is real, even if the bombs have not stepped out of the shadows. They wait there, like demons, to be summoned at barely a moment's notice. But there are growing numbers now, in India and Pakistan, for whom this hidden threat is not enough. They want to summon the bombs forth, into the light of day. They want their enemy to look into the face of the demon and tremble. The reason for this is simple. It is based on the idea of deterrence; peace comes from fear, and fear increases with the credibility of the threat - a man with a gun in his hand creates more fear than one who only says he has a gun in his pocket.

The current official thinking about the situation in South Asia starts from the presumption of absolute and unlimited animosity between India and Pakistan. For Pakistani military planners, India is just waiting to launch a war. The only way to stop the war from starting is through the threat to use nuclear weapons. Two things are needed for this threat to be credible. Firstly, India must be made to realise that if it attacks, Pakistan can retaliate with nuclear weapons. Secondly, India must realise that Pakistan is willing to use nuclear weapons. In other words, India must believe Pakistan can and will use nuclear weapons. The next war may well be a nuclear war.

The essays collected here are all motivated by a concern to prevent this. The views expressed by the contributors are their own. They have separately arrived at the conclusion that nuclear weapons have made Pakistan less, not more secure.

These essays are based on articles that have appeared in The News, Dawn, and The Friday Times. They are brought together in a book by the Campaign for Nuclear Sanity. The Campaign grew out of a meeting of like minded people, who came together in Islamabad in early 1995, to bring to the public the dangers posed by Pakistan's pursuit of nuclear weapons.

Zia Mian

Sustainable Development Policy Institute

Islamabad

March 1995

Nuclear Myths and Realities

Pervez Hoodbhoy

Introduction

The famous 18th century physicist, Blaise Pascal, had an argument for why we must believe in God. Should God exist, he argued, the penalty for not believing in Him is eternal damnation to the fires of Hell. But suppose that it turns out He does not actually exist. Then the believer will have suffered but a light penalty - some restrictions on his food and drink, abstinence in conduct, and perhaps a few other relatively minor inconveniences. Therefore, on balance, it is far better to believe than not.

This sort of logic has often translated into belief in nuclear deterrence. Conversely, lack of belief has become a form of heresy. Today a widely shared premise in India and Pakistan is that possession of nuclear weapons provides the ultimate guarantee of national security and stability. Not maintaining a nuclear capability, it is argued, amounts to dropping one's defences and inviting annihilation. Therefore, since survival is apparently at stake, financial and other costs pale into insignificance.

The strong emotions generated by the nuclear issue have precluded a genuine debate - either public or even at the higher echelons of government - on a matter which is both complex and of vital importance. Instead nuclear hawks, both in India and Pakistan, have long held centre-stage with their quixotic belief that a "balance of terror" is in the best interests of both countries. In consequence, there abound a plethora of myths and false perceptions, none of which are seriously challenged.

First, what accounts for the linkage of national pride with the Bomb? In the international arena, big boxers must be able to pack big punches - kilotons and megatons worth. Power, prestige, and politics have thus become intertwined in the consciousness of many. But how reasonable is such a linkage, and how much pride ought to be justifiably associated with the strictly technical achievement of nuclear capability?

Second, how much security does a nuclear capability really buy? Some in Pakistan believe that it has already proved its worth during May 1990, the "Cuban Missile Crisis" of the subcontinent. But, given the significance of the event, the lack of commentary on it is astonishing; little attempt has been made to understand its wide-ranging implications.

Third, one is often confronted with the argument that nuclear weapons on the subcontinent are a reality. Therefore, goes this argument, for both nations it is better to accept this and go overt rather than remain covert. The benefits of the position are frequently extolled. But what of the costs?

Fourth, if South Asia is indeed irreversibly nuclearised, then one must deal with the possibility that nuclear war can occur not only by the will of one or both parties, but also through chance and accident. What are the possible mechanisms by which this could happen? In this context, one must also ask how a South Asian nuclear deterrence might be different from the US-USSR one.

Fifth is the all-important question - what can be done to avoid nuclear conflagration in South Asia, whether by design or by accident? This is no longer an issue for the future and cannot await resolution of the fundamental disputes between the two countries. Therefore, what is needed is an India-Pakistan dialogue on nuclear issues and a set of possibly workable measures which could alleviate the dangers. What could these measures be?

Sixth, and finally, what are Pakistan's nuclear choices? Caught between a rock and a hard place, Pakistan will soon have to make agonisingly difficult decisions on its nuclear programme. As global pressure mounts for it to denuclearise, Pakistan's policy of deliberate ambiguity - which had served it so well politically and diplomatically in the past - is coming under greater stress. Therefore, new options must necessarily be explored.

Bombs for Prestige?

Why do some nation states seek nuclear weapons? The standard reply is that they feel their security is at risk. But this is obviously not the whole answer; the quest for power and prestige may be very important, perhaps even paramount. France and India provide two clear examples where nuclear weapons have been pursued primarily out of hunger for political power rather than for national security. Other countries too, including Pakistan, yearn for these instruments of mass destruction because they supposedly endow their possessors with true power.

Nuclear weapons, in a sense, are viewed by several Third World countries as a sequel to modernization; they come with "growing up", so to speak. The Indian case is perhaps the clearest demonstration of this. Nuclear weapons, with their surrounding mystique and awesome power to destroy, are glittery objects symbolising the mastery of advanced technology. National chauvinism finds a rallying point: build the Bomb! The Bomb means power.

The United Nations has done little to dispel this perverse view - all five permanent members of the Security Council are nuclear weapon powers. This implies a tacit admission that nations which command the power of mass annihilation are more important than those which do not. But the UN is way behind the times. Fortunately, the values of past decades are rapidly changing. The end of the US-Soviet confrontation has created the dramatic new possibility of a world with far fewer nuclear weapons.

Today, bomb worship is no longer the rage. There are excellent reasons for this. One reason is that designing nuclear weapons has become old hat. Unquestionably the first atomic bomb was an exceedingly brilliant, if terrible, achievement by the world's finest physicists. It required the creation of wholly new physical concepts, based on a then very newly acquired understanding of the atomic nucleus. The ensuing technological effort, the Manhattan Project, was quite unparalleled in the history of mankind for its complexity and difficulty. Thereafter the ability of a country to make nuclear bombs became synonymous with its technical prowess, and hence its strength.

But today, the design of atomic weapons, while still non-trivial, is vastly simpler than it was. Basic information is freely available in technical libraries throughout the world. The theory of chain-reacting systems, data on critical masses, equations for neutron transport, the assembly-disassembly phase of an exploding device, and so on, are published. Also available are technical treatments of compression, achievement of "criticality", initiation of chain reactions, build up of kinetic energy, and the final phases of the explosion as the pieces start to move apart. Advanced textbooks and monographs contain a staggering amount of detail which can enable reasonably competent scientists and engineers to come up with "quick and dirty" designs for nuclear explosives.

Benefiting from various declassified documents in the US, the general reader, as well as the nuclear weapon specialist, can now see cut-away drawings of weapons, photographs, and even once-classified test data. The Iraqis, it is now known, made direct use of the Manhattan Project data in their programme.

Nevertheless, not everyone or any nation can build its own bombs so easily. The biggest technical obstacle is the difficulty of obtaining high grade fissile materials, uranium-235 or plutonium. Plutonium is available only as a reactor by-product, and uranium-235 occurs naturally only in a heavily diluted form. These bomb materials are presently unavailable in the international market, even though covert sales of ex-Soviet made weapons-grade materials have been alleged. A nation which wants bombs almost certainly has to produce these materials itself. But the march of time has made this immensely simpler.

Today, a variety of techniques are available for the production of fissile materials for bombs. India has chosen the reprocessing route because it has a large number of civilian reactors whose spent fuel can be used for extracting plutonium. Pakistan has opted for centrifuge technology. Iraq had an extensive calutron program based on an electromagnetic separation method. Still more modern and effective methods are now available, and isotope separation by lasers is just around the corner.

None of these are trivially acquired or developed. Even today, substantial amounts of resources and engineering ingenuity are required to make any of these methods actually work. But it would be folly and ignorance to think of nuclear weapons development as being at the cutting edge of science or technology. One indication of this is that nuclear weapon designers in major US defence laboratories, like Lawrence Livermore, are finding it difficult these days to get jobs in industry or universities after being laid off. In those highly competitive environments, these scientists are no longer considered as belonging to the ranks of top quality scientists. The undeniable fact is that the technology of nuclear bombs belongs to the 1940's, and the furious pace of science makes that ancient history.

That bomb making is easier today than ever is evident. Presently more than a dozen Third World countries with quite marginal technological infrastructures, and which have no standing in the world of high science, can develop the rudiments of a nuclear weapons program. No scientific genius is needed; good engineering competence, dedication and hard work will suffice. The principal requirements are a sufficient degree of motivation and adequate funds. Pakistan has proved this point extremely well.

Threatened by the Indian nuclear explosion of 1974, and fearing attack from a much stronger and aggressive neighbour, Pakistan set about its own programme. By heavily concentrating its limited scientific energies Pakistan was able to build up a fairly sophisticated nuclear establishment which is disproportionately big relative to other areas of scientific endeavour in the country. This is not a bad achievement for a country with a per-capita GNP of US$400 per year, which has 74% of its people illiterate, and which offers an educational system competing for being the poorest in quality anywhere in the world.

But whatever their security benefits or liabilities may be for Pakistan or other countries, the fact is that in the present world nuclear weapons have irretrievably lost their old political clout and have been stripped of much of their mystique. With further passage of time, they will inevitably come to be viewed much as chemical and biological weapons are seen today - nasty and brutish means of mass annihilation, not as technical marvels.

Proof of the impending delinkage of international prestige from nuclear capability becomes evident upon examining the pecking order of nations today. Compare non-nuclear Japan with its giant neighbour, nuclear China. Which of the two exercises greater power in world affairs? Which is respected and courted more by other nations? And which offers a higher quality of life and opportunities to its citizens? Within Europe, one can similarly compare nuclear Britain with non-nuclear Germany.

No one doubts the ability of Japan, or other non-nuclear industrialized countries, to develop a full-fledged nuclear arsenal in a very short period of time if they should so desire. Unlike the crude, unreliable, and bulky weapons which countries like India and Pakistan are capable of developing, these would be slick, hi-tech, state-of-the-art marvels. But such weapons would add not one iota to the well-being of these countries. On the contrary, they would lose some degree of their prosperity and in exchange get a whole range of dilemmas which would serve to make them much less secure.

Nevertheless, old ways of thinking die hard. Many on the subcontinent continue to adhere to the Bomb as endowing respectability and status. On India the message of the dawn of a new age has been lost, and it is pursuing nuclearisation for prestige with unabated vigour. Indian militarism is on the rise and is being fuelled by the emergence of a new political culture in Delhi based on an alliance between the Congress elites, the bureaucracy, the military establishment, and a rising national bourgeoisie. The rise of rabid Hindu chauvinism, most recently demonstrated in Ayodhya, has led to a pathological obsession with achieving great power status. Following rapid military expansion after 1978, India now looks to nuclear weapons for projecting its military might far beyond its borders.

But, while India may succeed in setting itself up as a fearsome regional bully, this will not make it the great power it aspires to be. Great powers, after all, are not so easily made. The masses of India, for whom the Indian elite feel little but scorn and contempt, have drowned the country in a sea of ignorance and poverty. Religious, ethnic, and tribal conflicts exact their dreadful toll and the blackest forms of human misery stalk this wretched land. No hope exists for the abandoned pavement dwellers of Indian cities, whose number runs into tens of millions, or for their generations to come. Bombs are indeed a curious way to seek greatness.

The pride factor exists in Pakistan too, although to a somewhat lesser extent. There is a strong belief that the Bomb would elevate Pakistan's image among Muslim countries. Some cherish the fond hope that if Pakistan explicitly demonstrates its nuclear capability through a test explosion, oil money will pour into the country. But there is not the slightest reason to believe, nuclear capability or no nuclear capability, that Pakistan will thereby become less disadvantaged

in its relations to Arab countries. Pakistani workers in Saudi Arabia and the Gulf States will continue to receive shoddy treatment and be looked down upon. Pakistan's political leaders will continue to humbly make pilgrimages, as they do now, and supplicate Arab sheikhs for aid.

Understanding May 1990

Many Pakistani believers of nuclearisation cite May 1990 as the nation's first exercise of its nuclear muscle, and offer it as proof of its power to deter. The truth of the matter is of secondary importance; perceptions are more important here and the facts may never really become known. Enshrined as an article of faith is that it was Pakistan's threat of using nuclear devastation which had stopped Indian aggression dead in its tracks.

How exactly the nuclear threat was communicated to India is not entirely clear. Local and foreign commentators have versions which differ in detail somewhat. But the lore in Pakistan goes like this:

Troops had been massed on both sides of the border following heightened tension over Kashmir. Robert Gates, the national security assistant to President Bush, rushed to Islamabad to defuse the crisis. He met President Ghulam Ishaq Khan and General Aslam Beg, one of whom said that "we are desperate enough to blow India to smithereens". Subsequently, American satellites picked up a heavily armed convoy of trucks moving out of Kahuta towards Chaklala airport, where F-16's with nuclear capable bomb-racks stood ready on the tarmac. The information was conveyed to the Indians and they backed off.

This version of May 1990 has been staunchly denied by General Beg, now retired, an aspirant for high political office, and an outspoken advocate of the Bomb. In an interview almost three years after the crisis, he denied that Pakistan had a usable nuclear device at that time. Therefore it could not have been poised to use it against India. Moreover, in his opinion, such readiness was unnecessary because Pakistan had not been faced by a critical or desperate situation. Further, "there was a solid fear of massive retaliation from India as they have a stockpile of more than a dozen warheads", he said.

General Beg could well be telling the truth and May 1990 could have been a nuclear non-event. Indeed, some senior officials in Pakistan and India believe that the crisis was hyped up and that, in fact, there was no imminent danger of nuclear conflict. In that case, the only losers are those Pakistani journalists and political commentators who had raucously cheered a false victory.

But suppose that's not the way it really was. What if Pakistan, sensing an Indian attack, had indeed communicated a nuclear threat in May 1990? What if the Gates and trucks-out-of-Kahuta story is actually true? If correct, there are at least four profound implications of this:

First, it would have revealed weaponisation. The official line taken by both India and Pakistan is that they have developed the technical capability of producing nuclear weapons. This means that enough fissile material, other components, and technical know-how exists. However, both countries claim that, by choice, they have refrained from constructing actual weapons.

But if weaponisation had indeed been disclosed to Gates, then Pakistan surely laid itself open to application of the Pressler Amendment against it. This Amendment specifically refers to the possession of a nuclear weapon - not just the capability of being able to produce one. It was already in effect at the time of the crisis. Therefore, if Pakistan had indeed succeeded in convincing the Americans that it possessed a workable nuclear weapon then, by the same token, it must also have persuaded them to apply Pressler strictly. In having choked off the major source of its weapons supplies, it is far from clear whether Pakistan's alleged action was to its security benefit.

Second, and much more ominously, there now exists some possibility that the next Indo-Pak war will not go through the phase of a conventional war. Hitherto the general assumption has been that if hostilities commence, they shall do so in a controlled way and conventional weapons will be used. Unsheathing the nuclear sword would then either cause the war to stop, or only gradually escalate into a nuclear one. But, if Pakistani nuclear hawks are correct in saying that Pakistan suddenly brandished the Bomb in May 1990 before a single shot had been fired, then the next war may begin and end with a horrific nuclear exchange which would destroy tens of millions of lives in both countries.

In such a war India could suffer major damage to some of its population centres and key installations like dams and nuclear power stations. But Pakistan, which is physically smaller and faces a much bigger nuclear adversary, would be entirely devastated (see *The Costs of Nuclear Security*, in this volume).

Third, May 1990, if true, opens up the appalling possibility of Third World leaders playing with the nuclear button, even when their countries existence is not mortally threatened. This would serve to reinforce existing fears and prejudices against Third World nuclear powers in the international community. A trigger-happy nuclear nation, as General Beg correctly pointed out in his interview, is certain to be viewed as irresponsible. This situation is certainly not made any better by the statements of certain fundamentalists in Pakistani politics who have invoked concepts of "jihad" and "shahadat" in the context of nuclear weapons.

Fourth, it is important to understand that Pakistan's future security may have been seriously compromised if indeed it had chosen to exercise the nuclear threat once. The reason is simple: the nuclear sword is double edged. On the one hand, the terror it inspires can deter a potential attack. But, on the other hand, this very fear can inspire a pre-emptive attack aimed at destroying the opponent, or at least his nuclear weapons, before they can be used.

In a situation of extreme tension, there is bound to be much uncertainty and mistrust of the adversary's intentions. In all probability quick decisions, based upon incomplete information, will have to be taken. Past behaviour of the adversary is likely to play an important role.

Given that Pakistan is the smaller and weaker of the two nations, it is very unlikely that it would initiate a conventional attack on India. The Indians certainly understand that. They know that Pakistan would keep open a nuclear option so as to deal with a situation in which Pakistan's armed forces are being overrun by Indian military might. Thus, this would be a weapon of last resort.

On the other hand, the Indians also understand that Pakistan, because it feels insecure and threatened, may resort to desperate acts. To preempt such an act, a first strike would then be in the cards. Therefore, May 1990, if true, could be used as an argument to justify an attack.

Moving away from the Indo-Pak context, one may ask a more general question: does nuclear deterrence work? The most quoted argument in favour of this is that of Europe after World War II. For example, defence analyst Edward Luttwak claims that "we have lived since 1945 without another world war precisely because rational minds extracted a durable peace from the terror of nuclear weapons". It is impossible to verify or disprove such claims. There are other possible explanations for the non-occurrence of war too: the memory of the immense destruction in World War II, the absence of a territorial conflict between the US and USSR, and the relative timidity of Soviet ideology. While nuclear deterrence may have contributed to stability, the case is not iron-clad.

Nonetheless, it is entirely plausible that nuclear rivals are less likely to go to war against each other. Assuming both sides make rational decisions, the onset of hostilities is likely to be delayed, or they may not take place at all. The "balance of terror" argument does have a certain amount of validity, even in a situation of nuclear asymmetry such as exists between India and Pakistan.

On the other hand there is no guarantee that even in the presence of a nuclear deterrent, conventional war will not take place. Emotional responses of leaders cannot be predicted with any degree of certainty if a major crisis should occur. If war does commence, in all likelihood the course of events will soon cause it to get out of hand and escalate into nuclear exchanges.

There is, I believe, at least one available example where nuclear deterrence would have failed, had it become available to the adversaries during the course of a conflict. The Iran-Iraq war was a no-holds-barred conflict. Every type of weapon in the opponents' arsenals was used. Each side knew it would receive a response in kind, but was undeterred. In the War of Cities, population centres were devastated by long range missiles. A missile arriving on Teheran led to a missile departing for Baghdad. Both populations experienced the horror of chemical warfare. Would they have been spared the horror of nuclear warfare?

The ability of rivals to deter each other presupposes rational behaviour. Again, there is an available example where this assumption was not fulfilled: Saddam's Scud attacks on Israel were launched with the full knowledge that Israel could make Iraq a radioactive wasteland in a matter of hours. There was no military or strategic logic to these attacks; these were potentially suicidal acts motivated by desperation and fury. For the people of Iraq it was extremely fortunate that Saddam's missiles missed their mark or were intercepted before they could inflict real damage on Israel.

The Overt-Covert Debate

"Let India and Pakistan both become nuclear weapon states openly and without reservations. They are both mature nations which need no counselling on their international responsibilities and conduct". These lines could equally well have been written by an Indian or a Pakistani. Therefore it is necessary to volunteer the information that, in fact, they are from a published essay by retired Pakistani general K.M. Arif. But they could just as easily have been the thoughts of his counterpart in India, retired general K.S. Sunderji, or of a thousand others. There is indeed a curious meeting of minds, quite independent of the side to which they belong, between nuclear hawks committed to the "balance of terror" argument.

General Arif's argument requires that the Pakistani government shed its position of "calculated ambiguity" and, instead, openly declare possession of nuclear weapons. In part this comes from alarm at the aggressive pace of Indian militarization, particularly the continuing development of the Agni missile. And, in part, it comes from anger at the United States which has chosen to severely penalise Pakistan while effectively acquiescing to a much bigger Indian nuclear weapons programme. This pressure must be resisted, as it has been in the past, even though Pakistan's anxiety and anger have genuine cause. Rational conduct requires that the consequences of going overt be clearly thought out. This is critically important because such a decision may be essentially irreversible. Once a country goes nuclear, to pull back may be impossible.

On the scale of damages that Pakistan would suffer, the certain loss of economic and military aid from the West and Japan is a relatively small matter, even though it has received the most attention. Much more serious, but never openly discussed, are the consequences for Pakistan's national security.

It is therefore crucial to examine critically the five main arguments offered by advocates of Pakistan's nuclearisation. First, they argue, declaring the Bomb is unlikely to have any major effect because the Indians are likely to have cheated anyway and most probably already possess nuclear weapons. Second, our declaration of nuclearisation will lead to a freezing of the status quo through the existence of a credible and stable mutual deterrent. Third, even a few Pakistani bombs can constitute a "minimal deterrence" which will cause military competition to vanish. Fourth, the cost of a credible nuclear deterrent is affordable. Fifth, a nuclear deterrent will allow Pakistan to make up for the superiority of Indian conventional forces.

These arguments are apparently logical and carry force. But they must be weighed against even stronger counter arguments.

First, the current need to keep nuclear activities covert imposes very severe constraints on weapons development, the size of arsenals, and means of delivery. This has meant that the pace of nuclearisation, both Indian and Pakistani, has been slower than it would otherwise be. This factor should not be dismissed, particularly in so far as it rules out full-scale atomic testing. Keeping bomb development covert means that only "zero yield" and non-nuclear testing is possible. These tests, while crucial, are not sufficient if one wishes to develop fission weapons which are physically small, have high yield, and are reliable.

No nuclear testing is a far more important factor for India than for Pakistan, as is evident from the bitter ranting of Indian hawks at their government's doublespeak on the nuclear issue. On the one hand, it makes the mating of nuclear warheads to the Prithvi and Agni ballistic missiles difficult and perhaps impossible. This is because missiles require a fairly miniaturised warhead which must also be able to sustain huge accelerations. On the other hand, it also makes very difficult India's successful development of the far more complicated hydrogen fusion bomb or the miniaturised tritium "boosted" bomb.

There is little doubt that India's huge nuclear establishment is awaiting a Pakistani move. The Bulletin Of The Atomic Scientists, quoting a 1985 German intelligence document, writes that the Bhabha Atomic Research Agency's job was to be sure that "within two months of a Pakistani nuclear test, the second Indian nuclear test should be carried out. Such an Indian test should simultaneously be used for the development of a fusion explosion".

Second, declaration of overt nuclear status by one country, which will be responded to almost instantly by the other, is likely to have consequences which nuclear hawks have religiously avoided discussing. The reason for this is that although a plausible argument can be made that mutual nuclearisation will serve as a deterrent, there are only mere statements of belief available that such a deterrent would be stable.

To make the discussion precise, one could define a deterrent system as stable if it incorporates sufficient checks and balances to prevent a nuclear war on the basis of false or inadequate information, accident, or unauthorized command. Stability is crucial as nuclear deterrence cannot tolerate a single failure or mistake.

The issue of false information is an exceptionally serious one. In the US-USSR deterrence system, a massive system of early warning systems, both space and ground based, was needed to detect missile launches. In spite of a relatively long flight time of 20-25 minutes, the systems remained severely strained and is authoritatively known to have generated false messages of attack. The existence of redundant and multiple safeguards prevented accidental war, but the margin was not comfortable.

Indian-Pakistani deterrence will not enjoy the luxuries of the US-USSR case. With contiguous borders, a flight time of 5-7 minutes, and no space-based early warning systems available, much less data will be available to make reasoned judgements. Hence the temptation would be to adopt a Launch On Warning, strategy.

What this means is that on the mere assumption that a nuclear attack is imminent, a retaliatory attack could be launched. Pakistan would probably be forced to opt for this hair-trigger strategy as it has no capacity to absorb an Indian first-strike and be able to respond. But knowing this would make the Indians nervous. Since crisis misperceptions have a way of feeding and enlarging themselves, mutual nervousness may cause one or the other adversary to strike first for no good reason.

Third, the assumption underlying "minimal deterrence" is highly suspect. The assumption essentially is that the game ends once a country has made a few fission bombs and declared them. Security being assured, one can then go on vacation. Consequently, "minimal deterrence" assumes there is no constant drive towards bigger or more effective weapon systems, or any need to talk about second-strike capability - the ability to strike the enemy after absorbing the damage sustained in the initial nuclear attack.

The superpower experience, however, provides the antithesis to this argument. From the day that the first fission bomb was tested in 1945 by the US, the story has been one of constant escalation. In rapid succession there followed the jet bomber, fusion bomb, nuclear artillery, the

Inter-Continental Ballistic Missile, Submarine-Launched Ballistic Missile, supersonic bomber, Multiple Independently-targetable Reentry Vehicle warheads, and so on. Each new development, almost invariably pioneered by the US, was followed a few years later by the Soviets until, in 1991, the Soviet Union collapsed from sheer exhaustion.

This example is not enough to discourage hardened hawks like General Sunderji, or like-minded Pakistanis. In the course of a lengthy thesis, he approvingly quotes Bernard Brodie as saying that "Weapons that do not have to fight their like do not become useless because of the advent of newer and superior types". This makes little sense in the nuclear context. Even a nuclear deterrent, comprising a handful of bombs, will require continuously dealing with the enemy's new counter-measures, upgrading the means of delivery, developing ever more sophisticated surveillance systems, and modernizing the nuclear command and control system. Whereas initially there may be a fair chance of penetrating enemy defences, in later stages the nuclear arsenal will have to be greatly increased in size and made more sophisticated to compensate for diminishing penetration factors. Therefore, what may start out as "minimal" is likely to become anything but that with the passage of a few years.

There is a curious line of argument which ought to be mentioned here. It goes like this: nuclear escalation will not, as it did in the US-USSR case, occur on the subcontinent because South Asians have a special psyche - they are not greedy and will be satisfied once they achieve a simple deterrent. This hopelessly naive belief, which defies military logic, is based on an inverted form of racism - that we are somehow different and better than the rest of the world.

Fourth, is the issue of costs. There is a line of reasoning that if India or Pakistan go overtly nuclear, then they would be able to cut defence spending and concentrate on social priorities. The logic of this relies on the fact that atomic weapons do give "more bang for the buck". The US Atomic Energy Commission, in the 1960's, published a cost of only US$460,000 for a largish bomb of 100 kilotons (the yield of nuclear weapons is expressed in the equivalent amount of conventional explosives - 100 kilotons is thus 100 thousand tonnes of conventional explosive). This works out to only one quarter of one cent per pound, whereas chemical explosives cost more than 25 cents per pound.

The catch, of course, is that this figure is just the manufacturing cost and ignores the billions put into setting up the huge infrastructure needed for research and development of nuclear weapons. No figures are available for Pakistan, but Iraq has reportedly spent 5-10 billion dollars in its efforts to produce nuclear weapons. India, because of its large civilian nuclear programme, is able to hide a good fraction of its weapons development costs. Nonetheless some rough estimates have been hazarded by certain Indian defence analysts.

Bhabhani Sen Gupta, for example, writes "If the first generation nuclear deterrent we talked about would cost less than 4% (Rs 5000 crores) of a year's GNP in 1981 terms, the second generation of improved deterrent would cost a little under 8% of the 1991 GNP. This is affordable". What constitutes "affordable" can be endlessly debated. But the Indian government apparently cannot provide the most minimal needs to the street-dwellers of Bombay and Calcutta, a quarter of the total city population. Resources diverted away from the social sector feed an increasingly voracious military-industrial complex.

Fifth, to expect that nuclear weapons can credibly substitute for conventional weapons, once their existence has been openly declared, is unwarranted by facts. It is difficult to imagine that there would be any reduction of spending on conventional arms, or a reduction of the size of our military. The Pakistani and Indian militaries are both heavily involved in matters of internal security, and in border skirmishes which require visible demonstration of military might.

Certainly, the European experience provides a clear example of a massive nuclear force possessed by both sides, but which had to be backed up with a huge amount of air power, sea power, armour, and infantry. The fact is that conventional arms were considered quite indispensable because they are credible by virtue of having a much smaller area of destruction.

If they should convert the presently vague and existentialist nuclear threat into something palpable and poised for use, India and Pakistan would be irreversibly driven by the force of logic and circumstances into a situation whose gravity nuclear hawks either do not realize, or do not wish to discuss.

To conclude the point: if Pakistan were to lead India in declaring the Bomb, its security would be vitally damaged and it would be rendered vulnerable to any and every kind of attack. But Pakistan's subsequent insecurity will not work to India's advantage; a nuclear Pakistan will surely pose a grave threat to it. Therefore India should stop trying to push Pakistan over the brink even if it sees some temporary advantage in doing so.

On the other hand, if India declares nuclearisation first, Pakistan would be inevitably dragged into responding to the extent that it can. It would have to make the best out of a bad situation. But whichever government takes the first step will be justly reviled by the world for having put a billion people under the nuclear sword and, in the process, making both its adversary and itself more insecure than ever before.

Nuclear War - By Accident

"Neither India nor Pakistan wanted to go to war but we could have easily gone to war". General Zia-ul-Haq's remark, made soon after the crisis precipitated by India's Brass Tacks exercises along the Pakistani border in 1986, shows that an unwanted or accidental war between the two countries is not outside the realm of possibilities. That such a war could perhaps lead to a catastrophic nuclear exchange is a fearsome thought.

How could accidental war occur? The most likely setting for a nuclear holocaust is the pre-existence of some crisis, perhaps arising out of the Kashmir dispute. Assuming that Pakistan and India are both nuclear armed states, they will be constantly watching and monitoring each others activities. At a time when tensions are particularly high, each side will live in fear of a decapitating nuclear strike which could wipe out military or governmental centres of power. Thus, to attack before being attacked becomes dangerously tempting. In such a situation, fear and misperceptions about the adversaries intentions could precipitate an unwanted confrontation.

Clearly, this is a situation which has been encountered before. The US and USSR had an eyeball to eyeball confrontation for the major part of the Cold War. In this nuclear competition, billions of dollars had been spent on acquiring the most sophisticated forms of intelligence gathering by satellites, aircraft, ships, and submarines. The data from these were analyzed using computers equipped with artificial intelligence programs. This enabled both sides to know each others level of readiness for combat. If such an elaborate command and control system had not existed, a doomsday nuclear confrontation may well have occurred out of fear or suspicion.

For India and Pakistan this has clear implications. It would be folly to weaponise without developing an adequate command and control system. Moreover, this system should be protected so as to survive even a nuclear blast in the vicinity; i.e. be protected against the electromagnetic pulse which accompanies a nuclear blast and destroys all normal telecommunications. Without this either country would be like a blind and deaf giant twirling a nuclear truncheon, a threat to one's own self as much as to the other.

But then many worrying questions arise: would India or Pakistan be willing, or be able, to invest massively into command and control? Even though the requirements for India or Pakistan are relatively less demanding than for the US or former USSR because of fewer weapons, they are also more challenging in some ways. For example, missile flight times for sub-continental trajectories are only 5-8 minutes as compared to 20-30 minutes for intercontinental ones. In this time a decision will have to be taken whether the alarm is genuine, and whether the missiles are to presumed as nuclear armed. In the absence of accurate information, the only alternative is the dangerously unstable Launch On Warning policy.

A second kind of danger comes from the possibility of unauthorized use of a nuclear weapon by a pilot or field commander. Either through misunderstanding or ideological hatred of the enemy, a small group of individuals could deliberately initiate nuclear war. Again, the chances for this would be much higher in a pre-existing state of tensions, military exercises, or during a conventional war.

There are other possibilities which could initiate an accidental Indo-Pak nuclear war - disenfranchised sub-national groups within either country may somehow acquire access to a nuclear device, or a nuclear detonation could occur in the crash of an aircraft on one's own soil, and so on. Explosive dumps have often blown up for unexplained causes; one such explosion had rained death and devastation on the cities of Rawalpindi and Islamabad a few years ago. The explosion of a nuclear device would be immeasurably more serious than the blowing up of ordinary ammunition. The natural assumption would be that the device belonged to the other side. Even if the device actually belonged to one's own side, a government fearful of public reaction may not want to admit it. Depending on the circumstances, the demand could be for retaliation, not investigation.

The Second Best Option - Build Confidence

It is a canonical truth that peace can only come about if the cause of conflict is removed. In the Indo-Pak context this mandates some kind of resolution of the Kashmir dispute which takes into account the wishes of the people of Kashmir as well as the legitimate security interests of India and Pakistan. Today this seems a distant prospect. Closer seems the chance of yet another confrontation, more disastrous than any of the last two major ones. The urgency of the situation demands that one ask what partial measures, as distinct from a comprehensive peace settlement, might serve to inhibit war.

At a minimum, preventing a crisis in Pak-India relations from possibly escalating into a nuclear war requires that both countries soberly consider establishment of regular contacts at the highest level to deal with nuclear issues. What is needed is an institutionalised basis for exchanging and communicating information with the intent to reassure each other that a military attack is not about to begin, or that an ongoing conflict is about to be escalated to a higher dimension. Since the need for this would be greatest in times of crisis, such contacts should not be made conditional to whatever state of relations exist. Pakistan and India don't have to be friends to talk. But to talk may be critically important for mutual survival. This was something that the US and USSR had recognized when they signed the "Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War" at a time of continuous confrontation and competition.

There is much that needs to be discussed in such high-level meetings. First, there may be routine military activities - such as troop or aircraft movements during exercises or missile testing - which could be misinterpreted by the other side as a preparation for attack. For example, in 1986 the requisition of a large number of rail cars by the Indian Army to support their exercise had sent alarm bells ringing in Pakistan because the last time this had been done on a similar scale was in 1971. Meetings between the militaries could allay false suspicions.

Second, such meetings would be vitally important for establishing a truly operational "nuclear hot-line" between Islamabad and Delhi, perhaps on the pattern of the Washington-Kremlin one. This should be exclusively reserved for use in times of a potential nuclear crisis. Although the basic idea would probably be acceptable to both sides, there are an enormous number of details to be worked out. How, for example, should the identity of individuals using the hot-line be authenticated? What technical means should be adopted to ensure that the hotline never fails functioning? What protocols need to be established so that the line is used only for forestalling nuclear action and not to transmit threats? How may the psychological impediments to use of the hot-line - such as the fear of appearing fearful or nervous - be dealt with?

Third, procedures for dealing with nuclear accidents, an unexplained nuclear explosion, or thefts of nuclear materials could be discussed. For example, the reported theft of some kilograms of highly enriched uranium from the Bhabha Atomic Research Centre, if correct, is of grave concern to both countries.

Perhaps the greatest obstacle to bilateral nuclear contacts is the myth that nuclear secrecy enhances security. But, in actual fact, it is nuclear transparency which is crucial for survival. The reason for this is clear: unreasonable secrecy leads to suspicion, and suspicion can lead to unpredictable or paranoid reactions by the adversary. Therefore, it is to both countries mutual benefit to permit the other a "peek" into its secrets. Thus, the exchange between India and Pakistan of lists of nuclear installations is to be welcomed. But this does not go far enough. Much more is needed.

Averting Indo-Pak nuclear war also requires close attention be paid to two important technical issues: the first is "safer bombs". An unsafeguarded nuclear weapon can, in principle, be detonated by an unauthorized individual or by several kinds of accident. Given the drastic implications of this act, it is worth understanding the tremendous amount of energy and effort that have gone into construction of what are called Permissive Action Links (PALs), the elaborate electronic and mechanical safety catches installed on US and Soviet nuclear weapons. While no weapon can ever be totally safeguarded against misuse or sabotage, PALs certainly have made them safer.

Before 1958, US nuclear weapons were unprotected against unauthorized use. Only two special keys had to be inserted into a bomb to ready it for use. Soon it was realized that this was extremely unsafe and, in the 1960's, a massive effort was launched to ensure that a bomb would never explode to produce a fireball and mushroom cloud unless authentic instructions for detonation were received from the highest authority. This was the beginning of PAL technology.

Modern PALs installed on nuclear devices are impressive. The latest among them can detect if the device has been stolen and moved to an unauthorized place, and even sense efforts at sabotage. They feature combination locks which count the number of tries made, and make the device permanently inoperable by destroying critical parts if the tries are in excess of some prefixed number. Some PALs are "environmentally sensitive" and will not permit a bomb to explode unless it experiences accelerations in the right amount, and so on.

An additional benefit of PALs is that they can increase the degree of civilian control over nuclear weapons. Presuming that the ultimate launch authority in India or Pakistan is the elected government and not the military, no nuclear weapon can be activated unless a secret code has been received from the president or prime minister. This power of veto may be vitally important in preventing a holocaust. However, a glance at the history of US PALs shows that a military does not easily agree to civilian controls in such matters.

One can, therefore, make the case that if the existence of assembled nuclear weapons has been established without doubt, then the principles underlying PALs should be made available to both India and Pakistan by the US. Of course, the mechanisms are very weapon-specific. But the general principles could be sufficiently general so that they do not reveal any new tricks of how to make better weapons while allowing for the possibility of making the existing ones safer.

Safer bombs will also require new kinds of high explosives. In view of the catastrophic consequences of nuclear weapon accidents, in recent years there has been much discussion of the so-called "One Point Safety". This term refers to the condition that the bomb's nuclear fuel is not ignited even if the surrounding explosive at any one point is detonated. During the last decade it was realized that, in the event of fire or ordinary explosion, there is a fair chance that a nuclear weapon could undergo nuclear detonation even if it had not been readied for use. This could happen, for example, if a bomber were to crash on one's own territory.

To prevent this kind of catastrophe new types of conventional explosives, called Insensitive High Explosives (IHEs), have been devised. "One Point Safety" is assured by using IHEs. Again, this is the result of very intensive research and development, and one could make the same argument as with PALs that these be made available to both countries.

The best PAL and the best guarantee of "One Point Safety" is, of course, a disassembled nuclear weapon. If India and Pakistan refrain from assembling bombs, there will be no need for these complicated measures. But if bombs are assembled then several critical questions will arise. Would either country be willing, or be able, to invest in the tremendous amount of research needed to make its bombs safe for itself? Or, since there would be total secrecy in such matters, would there be a strong temptation to cut corners?

The second important technical issue is taming ballistic missiles. With flight times of the order of a few minutes, and with virtually no prospect of an effective defence against them, intermediate range ballistic missiles (IRBM's) are the single most destabilising element in the India-Pakistan confrontation. Carried on mobile launchers, and with little preparation time needed by solid fuelled boosters, missiles can carry out a sneak attack much more easily than manned aircraft. India has a sophisticated IRBM programme, comprising of development of the 1500-2500 km range Agni and the 150-350 km range Prithvi. The latter has been repeatedly tested and plans are away for its deployment. Pakistan has sought to counter this development principally through import of the Chinese M-11 missile, which is the rough counterpart of the Prithvi. It's indigenously developed missiles are as yet in a relatively primitive stage.

Although the accuracy of the guidance system of the Prithvi and M-11 is a secret, in all probability these missiles are inaccurate to at least several hundred yards. This means that their utility, when armed with conventional warheads, would not be for precision attack on military targets but, instead, to attack cities and population centres. They are, therefore, weapons of terror.

A still more ominous possibility is the use of IRBM's as delivery vehicles for nuclear warheads, for which accuracy is not critical. India or Pakistan have presumably not yet developed the technology of mating warheads to missiles, but this could be just a matter of time. Because a nuclear armed missile cannot be distinguished externally from a conventionally armed one, the deployment of any missile could be viewed with great alarm by the other side.

The highly destabilising effect of IRBMs cannot be offset by, for example, requiring that they be moved away from within range of the adversary's cities. The problem is that they could be quietly moved back for a sneak attack. Further, with the long-range Agni, every point in Pakistan - and much beyond - falls within its range. The conclusion which follows is the obvious one: there must be a regional accord involving China, India, and Pakistan which serves to cap IRBM deployments and hopefully to reverse it.

Options for Pakistan

Pakistan's nuclearisation continues to be driven by the need to match the relentless pace of India's militarization, conventional even more than nuclear, and derives support from the domestic political environment. But, on the other hand, stronger brakes are being applied by an international community increasingly more hostile to nuclear weapons in general, and fearful of a South Asian conflagration. Furthermore, it is becoming increasingly clear that Pakistan's fairly limited technological capability sets a limit in how far it can match India. A rational assessment of Pakistan's nuclear choices must be based on a consideration of these four factors:

The first is Indian militarization. The speed of this has been repeatedly underscored by tests of the Prithvi missile and the announcement of India's intent to deploy the missile in 1993. In 1989, with the successful launch of the Agni missile, India joined an exclusive club hitherto dominated by the world's five technological and military giants - the US, USSR, France, China, and Israel. India's armaments production industry is the largest in the Third World in terms of product diversity, research and development, and value and volume of production. It has matured since 1970 into a producer of diverse equipment and weapons especially aircraft and ships, and now intermediate range ballistic missiles.

India's ability to rapidly produce nuclear weapons in large numbers is not doubted by anyone. But it awaits an opportune time for this and so far it has maintained a yes-and-no nuclear posture. Articulating India's desire for big power status, Bhabhani Sen Gupta states that "If India goes nuclear - it may be in the 1990's - it will do so as a credible nuclear power befitting its self-image and its international and regional power. That will be only when India has developed a respectable satellite launching capability, acquired the capability of launching IRBM's and of building sophisticated warheads and carriers as well as surveillance systems". He concludes that India will not join the "junior club of small nuclear powers" but will wait to crash directly into the big time.

Domestic politics in Pakistan pushing the nation towards nuclearisation is the second factor. Since 1988, the nuclear issue has been used as a stick by both the incumbent governments and the opposition to beat each other with. Each has sought to establish its patriotic credentials by accusing the other of trying to damage Pakistan's security shield by seeking accommodation on the nuclear issue. Although India's growing military might is a source of genuine worry, it has been used as a justification for reckless military expenditure, which stands at least 36% of the current budget, and neglect of important social priorities.

Both the challenge of Indian militarization and popular domestic sentiment for the Bomb drive Pakistan along the nuclear road. But formidable obstacles lie ahead. The third factor is

global pressure to denuclearise, particularly from the US, which continues to mount. No longer a front-line proxy warrior against communism, Pakistan has been virtually abandoned by its decades old ally. For all the brave talk about self-reliance, the fact remains that the cut-off of military supplies as a consequence of the Pressler Amendment has gravely weakened Pakistan's ability to defend itself. A good fraction of the Navy will soon be no more as ships leased from the US are returned. In spite of having paid the US for them, Pakistan will not receive further supplies of its most advanced fighter, the F-16.

It is not, however, the US alone which has taken a firm stand on proliferation but Japan and Western European countries as well. The fact is that proliferation has become a bad word almost everywhere. Since the fall of the Soviet Union, there has been a major move globally towards denuclearisation and nuclear deemphasis. US and Russian nuclear arsenals will soon come down to one eighth of the sizes they had at the peak of the Cold War. Further, four proliferant states - Argentina, Brazil, North Korea, and South Africa - have formally renounced nuclear arms and have agreed to full-scope safeguards..

But in diametric opposition to these global trends, three states stand out as veritable bastions of nuclear proliferation - Israel, India, and Pakistan. The penalties, however, are least for the strongest and greatest for the weakest. Pakistan, being far more susceptible to external pressure because of the dependent nature of its economic and military relationships, has suffered much more than India.

The fourth factor is the limited technological capability available to Pakistan. This sets fundamental constraints on Pakistan's efforts to match Indian advances in hi-tech weaponry. While Pakistan, like India, is capable of making nuclear weapons, these would probably be few in number, crude in design and manufacture, of rather large size, and uncertain reliability. Explosive yield boosting, miniaturisation, PALs, and other sophistications are ruled out for Pakistan.

Much more importantly, Pakistan is not in a position to match India's development of IRBM technology or contest it in the field of satellite surveillance. These elements will be decisively important for all future military strategies, including those relying on nuclear weapons as a last resort. Thus, while a full-fledged nuclear race would be bad for both countries, Pakistan would stand to lose far more. It is therefore in Pakistan's interest to go out of its way to prevent such a race from occurring.

Given this fairly grim situation, the question is: what course of action maximizes Pakistan's security? Go overtly nuclear? Maintain nuclear ambiguity as far as possible? Or go the way of Argentina and Brazil?

The first - a declaration that Pakistan possesses a nuclear deterrent - would be the ultimate folly. It would be like manna from heaven for the Indian defence establishment and hawks of the Subrahmanyam type. This delight is for obvious reasons: after a Pakistani declaration it would be a no holds barred game where India enjoys all the advantages.

Released from all constraints, India could immediately weaponise and develop thermonuclear and artillery bombs, accelerate its IRBM and space satellite programmes, start work on submarine launched missiles, develop nuclear command centres, and aim for second strike capability. Meanwhile its rival, while still a threat because of the few crude weapons in its possession, would be screwed to the wall by an angry world and threatened by internal collapse as it seeks to raise defence expenditure.

The third route - which amounts to unilateral nuclear disarmament by Pakistan - is both impractical and unwise at a stage where India shows no signs that it would reciprocate the action. While it would be in the interests of both India and Pakistan to renounce these instruments of mass annihilation, it is also true that Pakistani proposals for a Nuclear Weapons Free Zone, and a five nation conference, have met scornful rejection by India which has accused Pakistan of "propaganda ploys" and playing to the world gallery.

This leaves only the second option; continuation of Pakistan's policy of deliberate nuclear ambiguity in the form of "Yes we have it, no we don't". But what worked in the 1980's is not working in the 1990's. The real question is: what will?

To answer this it is important to understand that Pakistan has, in diplomatic terms, played the nuclear game with great astuteness. But it must learn to play still better. Its proposals for a regional solution have put India in a spot. An editor of the Times of India, Praful Bidwai, in an article titled "Nuclear Policy In a Mess", observes that "New Delhi has been unable to dispel the impression that it is merely stone-walling and resisting every reasonable [Pakistani] move".

Pakistan must once again seize the diplomatic initiative, which has been so important to it. But it can do so only if it is perceived by the international community as being sincere in working towards nuclear accommodation with India. Therefore, it will be necessary for Pakistan to take some form of meaningful unilateral action. Pakistan's initiative would have to clearly demonstrate its desire to halt a nuclear race on the subcontinent, even at some cost to itself. The cards are now stacked against Pakistan; it is up to the shrewdness of its policy planners to make the best of a bad situation.

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A False Sense of Security

Mujib ur Rehman Khan

Introduction

After having lived under a nuclear threat for forty-seven years, the Western world can breathw easier today. Their nightmare is over, but not our's in South Asia. It seems we are on our way towards undergoing the same maddening experience that the Western world has just got over.

Before we discuss the situation in South Asia, let us try and find out why countries produce nuclear weapons. The reasons for building up the nuclear arsenal by the USA and the USSR are well known. The ostensible reason in almost all the other cases (France, Britain, China and India have all exploded nuclear weapons), is national security. But the reality is different. Take the cases of France and the UK. They went nuclear when they were part of NATO and had the protection of the US nuclear umbrella. There was, therefore, no threat to their security. Both these countries, however, were very conscious of their imperial past and did not want to be relegated to the status of lesser powers. Nuclear capability, they thought, was a symbol of a great power. They did not foresee that in future power will emerge from the economic strength of a nation and not from a nuclear arsenal. Japan and Germany are the outstanding examples. In the case of China, however, the security argument does have some validity.

But in the case of India, the basic reason for going nuclear is not national security - as she has hardly any threat from her much smaller neighbours, and an all-out war between India and China is quite unthinkable, militarily. In particular, India has no threat from Pakistan. India enjoys a clear superiority over Pakistan in conventional forces and her nuclear programme started much before Pakistan even thought of entering the field. It is on record that the Indian government gave the go-ahead for a nuclear explosion before her forces moved into East Pakistan. It seems obvious that India went nuclear not for security reasons but to become a dominant power in the region and to overawe her smaller neighbours. But it is now a well known fact that mere possession of nuclear weapons does not confer the title of dominant regional power.

Pakistan is one of those countries whose nuclear policy is based on the concept of nuclear deterrence. But nuclear deterrence is nothing more than a myth. This myth needs to be explored, so that it is exploded before any harm comes to our national security. Our nuclear capability has given us a false sense of security and there is a growing lobby advocating drastic reduction in conventional forces. This will make us highly vulnerable to foreign aggression.

Some of our nuclear strategists and defence analysts supported by some prominent journalists have propagated the theory of nuclear deterrence as the nuclear strategy for Pakistan. Their emotional-laden rhetoric has made the nation believe that the present state of our nuclear programme has been, so far, the single effective guarantee against an Indian invasion of Pakistan. The common man is so emotionally involved in this issue that any appeal to common sense or reason is immediately dubbed as unpatriotic.

Even the government of the day dare not disagree openly with our nuclear lobby, even if they wanted to. Only recently in a seminar in Islamabad a speaker confidently proclaimed that any government thinking of rolling back the nuclear programme should be prepared to roll back home. As the 'mullah' allows no reasoning in his domain, the high priests of the nuclear lobby in Pakistan, tolerate no other opinion or discussion. In such conditions, expression of a different point of view needs some courage. On some occasions, when one tried to put forward a different point of view, one was met with a hostile reaction. But even with such irrational opposition, one should not be deterred to say something which one believes in, and is in the national interest and in the interest of humanity.

A Matter of Perception

Pakistan's nuclear programme is considered as a deterrent to foreign aggression. It is claimed that if India has not attacked Pakistan since 1973, it was because of our nuclear programme. But one must challenge the validity of this hypothesis. Deterrence is a matter of perception. What deterrence a nuclear capability provides against a potential aggressor will entirely depend upon the other's perception.

Credibility of a deterrent can only be assessed according to a certain set of criteria. First of all, it depends on the conventional arsenal of a country, or its capability to produce quantities of weapon systems within a given time. The second is the ability to deliver it with accuracy at the desired target points. The third, in my view, is the will and decision to use these weapons. Then, of course, there are a lot of other factors such as the geography and size of the country, its economy, socio-political infrastructure and resources, the state and strength of the conventional forces, and not least, the state of a nation's morale. All these are to be compared with that of the potential enemy, in assessing the credibility of a deterrent. Considering these elements in the context of India and Pakistan, there could well be different opinions on the factors that underlie morale, but about tangibles it would be easy to assess that the military balance is very much in India's favour, both in conventional forces and in the nuclear field.

India's non-declared nuclear programme is believed to be far ahead of Pakistan. India possesses missiles which can deliver a nuclear device in any area of Pakistan, and it can be assumed that the accuracy of the delivery systems will continue to improve day by day.

Similarly, it can safely be assumed that both countries think they have a viable nuclear potential. But, India certainly has the power and capability to produce a greater number of nuclear weapons than Pakistan could under the best of circumstances.

Looking at the other aspect of a likely nuclear conflict, so far as geography and configuration are concerned India has a much greater capability to sustain and survive a nuclear attack than Pakistan. Some of our strategists tend to believe in the myth of the superior morale and courage of the Pakistani nation, for which they do not have any substantive arguments to prove their point. Some also think that Pakistan can take advantage of a first strike, which only makes sense if one has the ability to follow up with massive crippling blows to the adversary. A few dozen, or even a larger number of nuclear weapons in an arsenal carries nothing but the seeds of self-destruction.

Useless Nukes

Nuclear weapons are weapons that cannot be used. However hard we indulge in rhetoric to convince ourselves of the effectiveness of our respective nuclear programmes, it still remains a sterile effort. Our 'nukes' will only earn us adverse opinion from the world, and will be a source of fear and destabilisation in the region. We have to examine this issue in its logical connotations. The nuclear issue has to be evaluated not only in the Indo-Pakistan relationship perspective, but also as a regional question, which affects the socio-political, economic and ecological balance of South Asia.

A nuclear arms race between India and Pakistan carries the seeds of self-destruction, and untold misery for the entire South Asia region. A nuclear war between the two nations would be nothing short of insanity. Both countries are following a dangerous dead-end path, which they can economically ill-afford in the face of their burgeoning socio-economic and ecological problems. We already have potential "bombs", much more dangerous than the nuclear, in our growing population, ecological irresponsibilities and the factor of illiteracy which has downgraded the quality of our human resources to the most abysmal levels in this technological era of continuous progress.

The Pakistan argument that India will swallow up her is a fallacious contention. Pakistan is not a tiny morsel which can be swallowed and digested. No Indian policy-maker will be unaware of the fact that the defence forces of Pakistan are quite capable of defending the country. If India wants to dominate Pakistan, her policy has to be more subtle.

Another very common argument voiced in Pakistan is that India has not attacked Pakistan since 1973, because of the deterrence that Pakistan's nuclear programme poses. There cannot be a more vague and ambiguous argument. None among the propounders of this theory can justify the circumstances under which Pakistan will be able to use its nuclear muscle as a

deterrent. If we cannot defend ourselves by conventional means, our resort to a nuclear first strike will not justify our argument that we are fighting for survival, by targeting civilians in India's populous cities. The failure of conventional defence will only reflect upon our military and political incompetence, for having brought the state of affairs to such a pass.

Pakistan's first strike against India will bring the fury of India's atomic power upon our heads and it will imply the devastation of Pakistan. India has a much larger array of delivery systems for targeting Pakistani population centres. The retaliatory strikes will not only convey to us our imbecility, but will see the total destruction of our fragile socio-economic infrastructure. The world will pronounce Pakistan's doom and no one should want an irresponsible state like Pakistan to exist. We would be the first after the USA to have resorted to a nuclear solution.

Let us examine the scenarios in which Pakistan and India will try to 'nuke' each other out of existence. If it is our first strike, what will be its radius of effectiveness in terms of accessible targets? A maximum only of the northern areas of India, up to Delhi and Agra will be within Pakistan's range. Whereas all Pakistani cities are within India's strike capability. Destroying targets in East Punjab may please some cynics in India, but the fallout from a strike anywhere in northern India will have its deleterious effect all over Pakistan. India's industrial core areas are located well in depth, very far from our borders, and none of our delivery systems will be able to reach any of the Indian military-industrial complexes.

On the other hand, India cannot dare carry out a nuclear first strike against Pakistan. It will have to contend with an outraged world, who will see Indian as an irresponsible power making an insane bid for hegemony. Reaction against India will be strongly punitive, not for any love and sympathy for Pakistan, but out of fear that if it is Pakistan today, tomorrow it would be someone else. India's desire for hegemony in the region cannot be realised through nuclear weapons. Already some peripheral nations (like Australia) have started criticising India's nuclear pretensions and suspect its hegemonistic designs.

Let us suppose we continue with our atomic programme and produce nuclear weapons. In case of an armed conflict who will take the decision to launch a strike against, let us say, an Indian target? What will be the state at which this decision will be taken? These are questions, which rhetoric not-withstanding, will not have definite answers. Will Pakistan resort to nuclear means at the fall of Lahore, or when a strategic area is about to be overrun? How will our military incompetence in the conventional scenario, justify our escalating the conventional war over the nuclear threshold?

By the time we are in position to take such a momentous decision, our present borders will have had been pushed inwards towards the interior, putting us that much more at a disadvantage. At the same time, the Indians will have attained the necessary air superiority to have turned the scale of the conventional battle to their advantage. Under such adverse conditions, how do we launch this nuclear strike to stem India's military success? And how will it

help in changing the tactical and operational balance on the ground? We are today in no position to produce battle-field tactical nuclear munitions. Even at the tactical level, as we have discovered, nuclear explosions can only create chaos on the battle-field on an apocalyptic scale.

A nuclear Pakistan makes no sense to the world community. It will have no sympathy for Pakistan if we continue to follow a stubborn policy, even as a reaction to the arrogance of India. In fact, the enemies of Pakistan will applaud its nuclear programme so that it eventually enters the politico-military *cul-de-sac* where it is forced to use its nuclear capability against India. This is the moment they will all have been waiting for. The dismantling of Pakistan as an irresponsible state, a danger to world peace, will become the goal of the great powers.

A Sterile Pursuit

A senior military colleague argued recently that a nuclear bomb is a necessity for Pakistan, and that Pakistan should not use it, but only the threat of its use would be the necessary deterrence to keep India at bay. This is a superficially logical argument which is not supported by the concept of deterrence.

It must be realised that a threat can only be a threat if it can be effectively implemented. Pakistan and India both have a fair assessment of each others potentials and capabilities. Therefore, rhetoric can only have its impact on the man in the street, it has no meaning at the policy and decision-making levels. In that forum, specifics and ground realities make sense. If it is profitable to attack and the instrument to achieve it is effective, a nation may take the risk of aggression whatever the eventual cost - rhetoric and empty threats will not deter it from its objective. On both sides of the border, the decision-makers are aware that they are not dealing with imbeciles and the hard reality of the geo-political situation will not allow them to indulge in a nuclear war.

This nuclearisation programme has trapped both India and Pakistan in a web spun by their own irresponsible propaganda. Millions of dollars in foreign exchange are going down the tube into a sterile programme. In the West, nuclear power for peaceful purposes has proved hazardous and is going out of fashion. Alternate energy sources are being explored. By the turn of the century, nuclear power plants may well have become obsolescent energy sources, and the world entering the age of solar, wind and tidal power, and super-conductors. We seem to revel in technological obsolescence.

As a Pakistani, I feel we are slaves of our own mindless rhetoric and emotions. Nuclearisation of Pakistan will only create a dangerous sense of complacency in the other areas of its security system. Reliance on nuclear weapons implies the weakening of conventional forces which will make us very vulnerable to foreign aggression. Today, conventional munitions have become more deadly than the nuclear. The effects of a fuel-air bomb are as devastating as

the nuclear. While precision-guided munitions have made conventional strikes surgically accurate and extremely damaging.

India and Pakistan will have to find ways and means to ensure peace and security in the region, rather than become agents of destabilisation and conflict. Already, the subcontinent is beset by many endemic problems which will assume horrendous proportions and will be disastrous for humanity. Therefore, in my opinion both nations must take steps to make South Asia nuclear free. Otherwise, the road to a great tragedy lies open for both these countries and their neighbours.

The Costs of Nuclear Security

Zia Mian

Introduction

Powerful individuals and institutions in India and Pakistan increasingly share common positions over the issues surrounding nuclear power. At the state level in particular, there is no let up in the respective claims that the nuclear programmes of India and Pakistan are for peaceful purposes. The "peaceful" purpose in both countries is supposed to be the use of nuclear power to generate electricity.

The possibility of using nuclear power to produce electricity emerged in the West in the late 1940s and 1950s and was touted as a universal panacea. The early promise of cheap (perhaps even free), safe, unlimited electricity produced in nuclear power stations is now like a fairy tale. Decades of experience have shown that the impact on people's health and on the environment from nuclear power programmes is far greater than had ever been anticipated. To put it simply, using nuclear power to make electricity is like burning down your own house to have light to eat your dinner by.

It is clear however that the nuclear programmes in both India and Pakistan are far from peaceful. The pretence is actually quite half-hearted. Both states claim to have the capability to make nuclear weapons, and it strains credulity to believe that such capability just appeared one day, unsummoned, and unwanted. The nuclear power programmes have been deliberately used to conceal a nuclear weapons programme. The two go together; without a nuclear power programme, there would be no need to mine the uranium that can be used to fuel a nuclear reactor or to produce nuclear weapons. Without a nuclear reactor, there would be no source of plutonium, the only other material that can be used to make such weapons.

The argument that is now made by some of South Asia's nuclear armourers and their ideologues is that nuclear weapons not only provide security, but can provide "cheap security". This also rings untrue. A nuclear weapons capability only comes, especially to poor third world countries, after massive efforts spread over decades. No less a figure than Pakistan's former Chief of Army Staff, General (retired) Mirza Aslam Beg, has said that Pakistan's capability only came after "colossal hardships". The same conclusion emerges from looking at the experience of the superpowers, and the history of defence spending in Pakistan since it first claimed to have achieved its nuclear capability.

The real costs of nuclear weapons are much greater than just the narrow financial costs, which themselves are great for a poor third world country. There are also the missed

opportunities for improving the lives of the millions of people the bomb is supposed to protect, millions secure in their poverty.

With the diversion of social resources to create such a capability has come support, in both countries, for the imperatives of "nuclear security" in general, and a belief that the possession of, and threat to use, nuclear weapons is morally justified. Taken together, these amount to an agreement that both sides should be prepared in principle, and in reality, for the next India-Pakistan war to be a total war, involving the deliberate destruction of major cities in South Asia. This is the ultimate cost of the search for nuclear security.

The Human Costs of Nuclear Programmes

The debate on the nuclear issue in Pakistan is restricted. It is as if everyone taking part in it had accepted a set of limits as to what can and cannot be said, and since the limits of debate are set in advance it is no surprise that the same old arguments go around. Taking the official arguments at face value, for the purposes of argument, there are usually three reasons given for pursuing the nuclear power programme. The first is that the raw material, uranium, is in relative abundance compared to oil and gas. Secondly, the power generation process is reliable compared to hydroelectric (no load shedding). Thirdly, it has a positive effect on the scientific and technological capability of the state. The acute problems associated with the radioactive contamination of people, of land, air and water for time scales much longer than any other human effect on the environment, which have effectively killed off the nuclear programmes in most Western countries, merit little attention in Pakistan.

The scientific understanding of these problems has undergone profound changes in the last two decades or so, and the most recent work shows the dangers may be far worse than even the early opponents of nuclear power ever imagined. The full human and environmental costs of the nuclear age are there to be seen the world over, and the equivalent costs for Pakistan must be accounted for - unless of course if it is to be electricity (or given the real reason for the nuclear programme, nuclear weapons) at any price. In any such costing, the fact that people are affected by working with nuclear material is the crucial starting point.

Substances such as uranium undergo a spontaneous decay process where the nucleus at the centre of each atom breaks into usually two relatively large, but unequal, pieces and accompanying this decay is the emission of radiation and energetic particles. The larger pieces, or fission fragments, are in turn radioactive, and decay, accompanied by more radiation and particle emission. It is this radiation and the energetic particles that are a direct danger to health through the damage they inflict on any material they encounter. The exact details of particular kinds of radiation and particles are not relevant here, all that matters is that they are an inevitable, often deadly, accompaniment to the presence of radioactive materials.

The first link in the chain between radioactive materials and sickness may be traced back to mining areas in Eastern Europe 500 years ago, where severe illnesses in the miners were attributed to the special properties of the ore they were working with. It was not until the end of the 19th century that the special component of the ore was identified and named. It was to be called uranium. At the same time the illness of the miners was identified, it was lung cancer. One study in 1913 noted that about 40% of the miners from a particular village who had died in the previous 40 or so years had died from this disease. By the early 1940s lung cancer among uranium ore miners was a textbook case of exposure to radioactive materials. The insidious part of this exposure was that it took two or three decades from working in the mines to developing the lung cancer, and other diseases.

That this should have been sufficient to induce caution in ambitious nuclear plans but was not, gives a revealing insight into the heart of the "nuclear state". Rather than, for example, informing miners about the risks and encouraging them to take all possible precautions, an attitude of "what they don't know can't hurt them" seems to have prevailed. Uranium miners in the United States report that as late as the 1960s, they went to work without being informed about radiation or safety measures. In a remarkable 1967 testimony to Congress, the US Federal Radiation Council and the US Atomic Energy Commission argued for a balance between biological risk and the impact on the mining industry; records should be kept to assess the scale of the problem but no remedial measures should be taken. It is worth mentioning here that a 1984 survey of Native American men in one mining region of the US found that 72% of all lung cancer sufferers among them had worked in the uranium mines.

The scientific debate centres on the long-term effects of human exposure to radiation. Until recently, it has been standard practice to work out the long-term effects on people of exposure to radiation and energetic particles by using the data collected from the health records of the Japanese survivors of the American nuclear attack on Hiroshima and Nagasaki in 1945. In each city many tens of thousands of people died instantly, others more slowly, leading to about 240,000 immediate casualties. Each year over a thousand cancer deaths among the survivors are added to the total casualty list. These survivors constitute a tragic human database on the effects of radiation.

The official studies based on the health records of these survivors show unambiguously that a brief exposure to high doses of radiation causes cancer. The results are also used to assess the effects of lower doses of radiation over longer periods of time. The conventional picture that emerges from such work is that there is little long-term danger from the low levels of radiation normally encountered by workers in nuclear facilities. This has been used by the US Atomic Energy Commission and the US Department of Energy to argue that the standards limiting the exposure of workers in facilities dealing with nuclear materials are already stringent, do not need

tightening, and even to argue that the standards set just after World War II were too high and could be lowered.

There are however other indicators that suggest confidence in these official studies may be misplaced. It has been known for over thirty years that the data from the Japanese survivors of Hiroshima and Nagasaki underestimated the effects of radiation, such as X-rays, on babies still in the womb. Japanese children exposed to such radiation from the American bombing while still in the womb, showed no increased incidence of leukaemia, but data from medical records from Western hospitals suggest that children exposed to such radiation during routine X-raying of pregnant women have a 60% greater chance of developing this disease.

Recently, new and more directly relevant data has come to light. The medical records of nearly ten thousand workers at a major US nuclear facility were made public, because of a court case. Analysis of these records suggests that even the levels of exposure to radiation that were previously considered safe do, in fact, increase the occurrence of cancer. The time between exposure and the first signs of illness may be a decade. In comparison, the Japanese data would imply that there was no chance of such an increase. Workers in nuclear facilities exposed to even low levels of radiation are more likely to get cancer of the respiratory system, since they breathe the radioactive material into their lungs. They are more likely to get cancer of the digestive system, because they swallow radioactive material in the air. They are more likely to get cancer of the bone marrow, because some absorbed radioactive material is concentrated there by the body.

It is not just one particular facility that was dangerous. From beginning to end, the nuclear cycle is beset with problems and dangers to workers in the industry, people in the neighbourhood, and the environment alike. It all begins with getting uranium out of the ground. After mining uranium ore, and exposing the miners to radioactive dust and gases which they breathe and swallow and take home on their clothes and on their skin, the ore is processed. The ore is then crushed, mixed with water and chemically treated. In the next stage, the product is dried and washed again and roasted to produce a concentrated form of uranium called "yellow cake". In the drying process considerable amounts of uranium are lost to the air as dust, polluting everything it reaches as it is carried by the wind. Most of the original material dug up from the ground is left behind as waste, in the form of a mixture of poisonous solids and water, and still retains most of the radioactivity of the original ore.

This mixture, or "mill tailings", is stored in large open ponds to settle, even though it will be radioactive for hundreds of thousands of years. Small specks of radioactive material can be lifted from the tailings and carried by the wind, further exposing communities in the area. To prevent this, the tailings are often stored underwater, but then the underground reservoir which is often the source of clean drinking water is polluted by material from the tailings pond. Once polluted such a reservoir cannot be cleaned up. There are the further dangers of the radioactive

material getting into the local food chain, if food is grown near the ponds. There are accidents at tailings ponds too. In 1979 a US dam holding uranium mine tailings burst, and the tailings flowed into a river. The river water became unfit for drinking, animals who drank the water became contaminated, and the ground water contained radioactivity to a depth of 10 metres.

The US experience suggests this is by no means an unusual occurrence. In the space of twenty years there were 15 accidental tailings pond leaks, seven dams failed, five pipelines carrying the waste burst and there were two floods. It is particularly important to note that even "safe" tailings ponds are dangerous. Heavy rain can carry the toxic and radioactive material from the ponds to streams and rivers and into the ground water.

The history of the nuclear age is a history of atomic energy commissions covering up accidents at their facilities. Even in the US where, thanks to the Freedom of Information Act, there is relatively greater access to information, it was not till 1986 that the public was informed of severe radioactive contamination of areas surrounding a major nuclear weapons facility going back to the 1940s and 1950s. A medical assessment suggested that 5% of the people in the surrounding areas were exposed to "significant" amounts of radioactive material.

It is not only nuclear weapons facilities that are a danger. In England, at the site of the world's first nuclear power station (opened in 1956) there was a fire in a nuclear reactor in 1957, which burned for nearly three days producing radioactive smoke that spread over the countryside. There is evidence that radiation from the 1957 accident spread as far as Denmark and Germany. In a 700 square-km area around the power station the grass was poisoned by the radiation, and milk from cows grazing on it was banned for public consumption. Official estimates say that there were nearly three hundred cases of cancer in the wake of the accident. The figure is low only because the area was sparsely populated.

An accident at a reactor sited close to a city, or in an intensive agricultural area, or close to a major river would have immeasurably worse results. The worst such reactor accident, so far, was at the Soviet Union's Chernobyl power station in 1986. About 135,000 people, in fact everyone within about 30 km of the reactor, were forced to leave their homes. The soil in this important agricultural area will not be cultivable perhaps for a decade. The estimated human fatalities from the cancers induced by the accident range from thousands to over 100,000 in the next few decades, all over the world.

It is not only nuclear weapons plants and reactors that are hazardous, even lethal, to those who work there and the local population. An explosion at a Russian site storing just the waste from the manufacture of nuclear weapons in the late 1950s is believed to have killed hundreds of people and poisoned thousands of square miles of countryside. A Russian scientist who drove to the area reported that "on both sides of the road as far as one could see the land was dead; no villages, no towns, only the chimneys of destroyed houses, no cultivated fields or pastures, no pastures, no herds, no people... nothing".

Nuclear Accidents

That nuclear accidents can happen in nuclear facilities in Pakistan is obvious. After all they happen every where else. But the particular kinds of accidents that are likely here are a little more difficult to gauge. To understand what can happen in Pakistan, or has already happened and never been made public, the Indian experience with their reactors can be, and should be, used as a guide. This is because there are some significant similarities between the Pakistani and Indian nuclear power programmes. Pakistan's only nuclear power reactor is the Canadian designed and built Karachi Nuclear Power Plant (KANUPP); it is similar to the Rajasthan Atomic Power Station, and those at Madras, Narora and Kakrapar in India.

The Indian experience is frightening. There is a report on "unusual occurrences" at Indian nuclear facilities which shows the frequency of these accidents, for that is what they are in every day language; there were 147 during 1992-1993. An accident every two and a half days, or one every sixty hours. Writing in *The Sunday Times of India* (March 13, 1994), Praful Bidwai explained that this was not an unusual year: "'India's 27 - year long experience with atomic electricity generation is a story of accidents, flagrant violations of safety rules, avoidable exposure of workers and the public to radiation and toxic substances..." How many such "occurrences" were there in Pakistan, last year, or the year before? Only the Pakistan Atomic Energy Commission (PAEC) knows and they are not telling.

One example shows just how similar the actual accidents are that can occur in India and Pakistani nuclear facilities. The Rajasthan plant has had leaks of heavy water - the special kind of water produced for use in certain designs of nuclear power stations. In early 1981 the Rajasthan plant lost 8 tonnes of this heavy water in one incident. The PAEC 1988-1989 annual report reveals a spill of 40 of tonnes of heavy water at KANUPP.

Some of the other accidents at Indian plants were much more severe. An unknown number of people were exposed to high doses of radiation as they tried to remove radioactively contaminated material from the Rajasthan plant. There was a major fire at the Narora plant in 1993, leading to radiation leaks in the reactor buildings. At Madras, the giant steel tube containing the heavy water and rods of uranium fuel suffered from failure of a weld. If the reactor had been in full operation there could have been a major accident.

There are other examples of near disasters. In 1994, the Kakrapar power station had its turbine room flooded; if the plant had been producing electricity at the time it could have exploded. At Kaiga, a plant that is still under construction, a massive block of concrete weighing nearly one hundred and fifty tonnes fell from the inside of the dome. The dome is meant to be the last and most impenetrable barrier preventing the release of radioactivity if there should be an accident involving the nuclear reactor.

There is little reason to believe that the attitude to safety at KANUPP is much better than that which seems to prevail at Indian reactors. The evidence indicates complacency. In a paper presented at a 1988 International Atomic Energy Agency conference, senior PAEC officials recognised "obsolescence has now become a major problem for continued operation of KANUPP". Despite this, they argued "wholesale changes *merely* to comply with the latest safety criteria are not feasible".

It is important to, understand what is being said here. Firstly, the PAEC admits KANUPP is old, and its age is causing problems. Secondly, they admit wholesale changes can be made to the plant. But the PAEC does not believe it is worth making these changes just to be sure KANUPP meets the latest safety requirements. This is even more worrying when one sees reports from ten years ago about KANUPP describing it as being particularly prone to problems, "including transmission line failures, and operator errors."

The similarity between the Indian and Pakistani nuclear power programme goes much deeper than this attitude to safety though. The Canadian reactor on which they are based was first operated in 1966, but work on India's reactor in Rajasthan started before the Canadian reactor was even finished, while work on KANUPP reactor started in 1966, without waiting to see how well the Canadian plant would actually work. Subsequent studies show that the Canadian reactor's performance has been "disappointing". So disappointing that the Canadian power company which was supposed to buy this plant didn't want to, even though it was offered a price that was specially subsidised.

The poor performance is not a surprise. The Canadian reactor was set up to produce 200 Mega-Watts of electricity, (enough to light 2 million household light bulbs of 100 Watts each), which is fine for a prototype. For a proper power reactor of this design a minimum rating of 500-600 MW is usually considered necessary, if it is to be economically viable. However the Rajasthan and KANUPP reactors can produce only 200 MW and 125 MW respectively, barely a quarter of what is needed if they are to be worth the investment.

The histories of these reactors show their value as a source of electricity is minimal. The Canadian plant only produced electricity for four years, after that it became a glorified kettle, primarily producing steam for another plant. The Indian Rajasthan power station has apparently not worked continuously for more than three months since it was set up. KANUPP has been even worse. The Economic Survey of Pakistan shows that in 1979-1980 KANUPP produced electricity for a grand total sixteen hours in the whole year (assuming it was actually producing as much electricity as it is designed to). In 1988 - 1989 it produced electricity for all ten days in the year. Even if these two years are taken out (because of accidents?), the average amount of time this nuclear power station was generating electricity turns out to be about two months a year, for twenty-two years.

Pakistan is making the same mistakes all over again with the Chinese-designed 300 MW nuclear reactor being built at Chashma in Punjab. There are two obvious risks of this particular scheme. The first risk is specific to this reactor, it is an untested design - even the Chinese describe it as a "prototype". As the first effort at domestic design by the Chinese nuclear industry some of the equipment for it is being imported, but most is of Chinese manufacture, and questions of quality control become important. Despite being untested, this is an old design. The prototype at Qinshan was initially approved in the early 1970s but only came into operation in August 1992. Without access to design information it is impossible to say whether it relies on twenty year old safety systems, or if it has been redesigned to include all the safety lessons learnt in the last two decades. The Chinese may well have the same attitude to safety as the PAEC, and have decided that changing the design "merely" to meet the latest safety criteria is unfeasible!

An impression of the competence of the Chinese nuclear industry can be had from the problems with their foreign-built nuclear power station, at Daya Bay, close to Hong Kong. There have been dozens of "incidents" (Chinese for "unusual occurrences"?) over the last year and a half, including unexplained shutting down of the plant. The International Atomic Energy Agency inspectors who looked at Daya Bay suggested more training for the people working there and "completion of the translation of operating procedures into Chinese".

The second risk from the Chashma plant only adds to the first. It is the risk of putting a nuclear power station, especially an untested reactor built by people with little experience, on the banks of a major river. This is why most reactors are built close to the sea; an accident will poison the sea, which the nuclear industry hopes is large enough to dilute the radioactivity enough for it not be a danger to human health. Any release of radioactivity from Chashma would contaminate the Indus, and if there were a major leak Sind would be devastated. This possibility becomes more alarming when it is reported that: "geological experts and some Pakistani officials charge that the reactor site was chosen for political reasons and that earthquake dangers discovered earlier were hushed up" (Who Should Determine Pakistan's Nuclear Policy; Abdus Sattar Ghazali, *Dawn*, 19th September 1993).

The time has now come to ask if Pakistan needs its nuclear power programme. If all the new investment in the conventional energy sector, amounting to thousands of MW of capacity, that the government promises is more than wishful thinking then the 125 MW, for a few weeks a year, from KANUPP will be a drop in the bucket. There will be no loss in closing down a reactor that is twenty years old, largely useless, and dangerous operating close to a city of nearly ten million people. Because of its age, KANUPP will have to close down soon anyway, and it is better done sooner, and safer, than later.

It is not too late to halt construction of the Chashma nuclear power station either; work there has barely begun. By the time it is producing electricity its 300 MW will be a tiny portion of the supply and not worth the dangers it poses. There is certainly time to cancel plans for the

second reactor to be built at Chashma. These plans would only double the risks of disaster. These are all decisions that need to be taken now. The longer the delay the more difficult will the decisions become, because more money will have been spent and more prestige invested on these new projects. The longer the delay the more likely it is "unusual occurrences" will become all too usual.

Nuclear Guardians

Why then, despite the world-wide catalogue of disasters and tragic experiences with nuclear programmes, do countries like Pakistan and India persist in their civil "nuclear capability"? The answer is not hard to find. Nuclear programmes the world over are cloaked in secrecy, the light of public accountability is never allowed to shine on them. In this darkness, fierce monsters breed, and claim, like dragons, to guard a great magical treasure. In this there seems to be little difference between even a relatively democratic state like the US and a state like Pakistan, with a tradition of arbitrary authority and secrecy. In both the United States and Pakistan all "they" have to do is say the magic words "the National Interest" and everyone goes quiet. The nuclear guardians are supposed to know best. But it creates suspicion and with suspicion comes fear.

To offset such concerns about the secret dangers of nuclear programmes, arising from the lack of public accountability, the government has used the same solution as many other countries and announced (*Dawn*, November 9th, 1994) that there is to be a Pakistan Nuclear Regulatory Board. While any effort to reduce the ever present dangers of working with nuclear materials is to welcomed, how this is to be done is obviously a matter of great concern.

International experience suggests that to be effective, a genuine nuclear regulatory body needs two things. It has to have a clearly defined mandate to critically examine all existing safety regulations and practices, in all facilities involving radioactive materials, and be able to change them. And it has to consist of people willing and able to take on the nuclear establishment, which traditionally has been very resistant to putting safety first among its concerns. In the case of the Pakistan Nuclear Regulatory Board there is already considerable cause for misgivings.

The statement announcing the setting up of the Board describes the eight functions that it is supposed to perform. The first is "Oversee and review the performance of the Directorate of Nuclear Safety and Radiation Protection (DNSRP)." This is the part of the Pakistan Atomic Energy Commission that registers and licences facilities that use radioactive materials, and inspects these facilities to make sure that they are working safely. The Board, it seems, will keep an eye on DNSRP and make sure it is doing its job properly. The important question will be how the Board interprets this role - will it start by fundamentally reassessing what DNSRP is supposed to do, and try to help it by initiating independent studies on safety issues? Or will it

adopt without any kind of review or modification, the existing safety and licensing regulations of DNSRP and just rubber-stamp them?

The second function of the Board, as set out in the announcement, addresses just this problem. This function is quite explicit; "Approve the regulations, guides and codes of practice." There is no mention here of "review" or "investigate", the Board is only there to "approve." There is no room for trying to improve the regulations. this sense of the Board basically approving whatever is brought to it comes across strongly from some of its other functions; it has to "approve" various committees, and "approve" the policy on exempting facilities from licence fees, and "approve" general policies about the funding of DNSRP.

The Board is allowed to "review" appeals against decisions made by DNSRP, and any research and development projects in nuclear safety, health and environmental protection. Again what is missing here is the sense of the Board being mandated to launch investigations, or research and development projects in nuclear safety, health, etc. It can only respond to what is brought to it.

Even with these constraints it is not impossible for the Board to function as an independent body, albeit limited, that can investigate existing safety regulations and practices and impose new safer ones. The way it chooses to interpret it's mandate depends critically on who is on the Board and how much leverage the Atomic Energy Commission will have in trying to stop them prying into the existing ways of doing things. According to the announcement the Board will have a Chairman, three full-time members, and five part-time ones. The Chairman of the Regulatory Board will be none other than the Chairman of the Pakistan Atomic Energy Commission, whoever that happens to be. This removes even the pretence of impartiality; the least that could have been done was to have an independent Chairman of the Regulatory Board.

What about the three full time members and the five part time ones, perhaps they will be likely to push for a fresh look at all aspects of safety in Pakistan's nuclear programme, and demand that the best safety standards applied anywhere in the world should be introduced here, and complied with rigorously. The Secretary of the Board will be the Director-General of the Directorate of Nuclear Safety and Radiation Protection. The man whose job it is within the Atomic Energy Commission to look after safety issues. The only other member of the Board who is specifically identified, and by now it comes as no surprise, is also from the Atomic Energy Commission. It is the Member-Administration.

The so far unknown elements are the third full-time member of the Board, and the five part-time members. Curiously, the identity of the third full-time member of the Board is not mentioned anywhere in the announcement, and the part time members are supposed to be "senior scientists/engineers/experts from outside the Atomic Energy Commission." What is meant by "outside the Atomic Energy Commission"? Since it is the government that will appoint the third full-time member and the part-time members, and given the Chairman and Secretary, it seems

pretty certain that these members will be a mix of ex-Atomic Energy Commission "scientists/engineers/experts" earning a little extra in their retirement and some under-employed nuclear bomb-builders. In other words no one who would ever rock the boat.

It comes as no surprise that there is one final glaring omission from the announcement about the functions and composition of the Board. There is no mention of a commitment to public information about health and safety issues arising from the operation of nuclear facilities. This is something that characterises the whole nuclear establishment. The Pakistan Atomic Energy Commission, for example, produces an Annual Report, which describes itself as "an incisive document of self-assessment." How seriously the Commission takes it is evident from the fact that the most recent Report is for 1991-1992, and that it is all of fifty pages. The expenditure by the Commission in that year was nearly 1,500 million rupees.

It seems pretty clear that the Pakistan Nuclear Regulatory Board is to be just another Committee where the same old faces sit around another table, and tell each other how well they are doing. Even this it will do in meetings held behind closed doors. If by some freak of good fortune it ever decided not to approve an activity because it is unsafe and dangerous to human health and the environment, this would never be made public. The damage these activities may have done would be hushed up. There would be no question of negligence by the Atomic Energy Commission or compensation for those affected. It is an ideal arrangement to protect the nuclear programme from the people.

Buying Security with Nuclear Weapons

Apart from an agreement that nuclear power is a worthwhile and safe investment for producing energy, and that the likely accidents are tolerable, there is one other argument, dating from the Cold War, that is increasingly shared among those in India and Pakistan who support nuclear weapons, but need an acceptable justification. It is that nuclear weapons can provide cheap security. For example, *The Muslim*, which has traditionally supported Pakistan's nuclear weapons programme, very openly agrees (*The Muslim*, February 16, 1994) with a recent report from the Indian Institute for Defence Studies arguing that military spending can be substantially reduced, and so resources freed for social spending, by relying on nuclear weapons and a smaller high-tech army, rather than continuing with a large, expensive, conventional military force.

There are actually three distinct but connected claims being raised here. Firstly, there is the claim that nuclear weapons provide security. Secondly, that reliance on nuclear weapons allows for a small army, and thus a substantial reduction in the present size of conventional military forces. Thirdly, it is claimed that nuclear weapons not only offer security, but are cheap.

All these aspects of "nuclear security" need to be addressed. This is because the appeal being made to the public in this claim of "cheap nuclear security" is that the nation will be both

safer and economically better off with nuclear weapons than without. Nuclear weapons are more than just the sort of "things" one goes and buys from a shop. They are part of the search for "nuclear security". The setting up of a nuclear weapons programme marks the beginning of this process, not its end. But the pursuit of "nuclear security" by one state creates a sense of "insecurity" in others, which they then try to overcome.

A simple example of this is the rationale offered for Pakistan's nuclear weapons programme. It is supposed to be a response to India's nuclear programme, which is claimed, in turn, to be a response to the Chinese programme. This competitive dimension is, in fact, common to all attempts to achieve security by military means, nuclear and non-nuclear, but with nuclear weapons the stakes involved have become much greater than ever before. It follows from the strategic notion of "deterrence"; which is not peculiar to nuclear strategists, but has been associated with weapons throughout history.

The logic of "deterrence" says a nation always has to be prepared to fight. There is, therefore, a great deal of importance attached to the readiness to fight a war at any moment. Deterrence theorists argue that this "readiness" defers the outbreak of war. But they fail to understand that this "readiness" not only undermines any effort to prevent crises from developing in the first place, it becomes increasingly costly.

In the specific case of Pakistan's nuclear programme, the pressures to increase "readiness" are sure to mount. A former Chairman of Pakistan's Atomic Energy Commission has already observed that "all weapons systems, including nuclear devices, lose their effectiveness over time. New technological advances render them obsolete." This, to him, implied that "defence preparedness has to be renewed and upgraded year after year" (*The News*, February 10, 1994). However, the open-ended and unlimited renewal and improvement of "defence preparedness" is certain to claim scarce resources "year after year". An apt analogy may be drawn from heroin addiction; the victim spends more and more time, effort, and of course money "chasing the dragon."

How severe nuclear-addiction can be is evident from the experience of the nuclear junkies who have already travelled this road. The US started with two atomic bombs, which destroyed the two Japanese cities of Hiroshima and Nagasaki in 1945. In 1947 its military planners wanted three bombs to use on Soviet cities, by 1949 they wanted 220, and by 1960 they had 18,000 nuclear weapons. The number of types of nuclear weapons also increased; ranging from bombs that weighed less than 50 kilograms to those weighing several tonnes. The destructive power available increased enormously when, following the Soviet nuclear test-explosion in 1949, the US detonated the first hydrogen bomb in 1952 - a feat which the Soviets duplicated within a few years.

The delivery systems for nuclear weapons increased not only in number, but in their range, and in sophistication. There are long-range bomber-aircraft, nuclear artillery shells, short-

range, intermediate-range and intercontinental ballistic missiles, that can be launched from silos on land, or from submarines, and now cruise missiles that can be launched from aircraft, ships, and even from a truck. What has increased throughout is the speed, complexity and lethality of the weapons system taken as a whole.

This nuclear arms race did not create security for the US or the USSR. The former director of Defence Engineering and Research at the Pentagon, H. F. York, has argued, with the wisdom of hindsight, that "ever since shortly after the second world war, the military power of the US has been steadily increasing. Throughout this same period, the national security of the US has been rapidly and inexorably diminishing...From the Soviet point of view the picture is similar but much worse." In other words, historical experience shows that building nuclear bombs, missiles, nuclear submarines, etc. does not make a state more secure.

Should anyone want to argue that this wild arms race and consequent increase in "insecurity" is a specifically superpower experience, they will firstly have to explain why Britain, France and China did not stop their weapons programmes when they had built atomic bombs. All these nuclear weapons states went on to build hydrogen bombs, missiles, submarines and so on.

There are signs that the next stage of competitive escalation has already started in South Asia. It is widely believed that Indian nuclear bomb designers have been working on a hydrogen bomb, and there is probably a similar team somewhere in Pakistan, desperately trying to catch up. If Pakistan's military planners were ever foolish enough to explode an atomic bomb as a test (and as a demonstration) then India's would almost certainly respond with a nuclear-test aimed at developing their hydrogen bomb.

Given that India and Pakistan are developing missiles and buying submarines, clearly they are not immune to the escalation that comes from the logic of "deterrence". Even Prime Minister Benazir Bhutto half recognised this when she referred to "fears" of an "arms race", and "huge defence establishments" (*The News*, March 13, 1994). Why she thinks these are still "fears", something that *may* happen, rather than something that *is* already happening is a question someone should ask her when it comes to preparing the defence budget.

The simplest way to test the second claim - that nuclear weapons allow a country to reduce its conventional military forces substantially - is to examine the historical record. The experience of the nuclear weapons states, especially the US and the (former) USSR, states whose formerly hostile relationship mirrors the one that now prevails between India and Pakistan, is particularly valuable. The time frame over which the data are of most interest is that during which these states had developed their nuclear arsenals and constructed their respective nuclear-armed alliances, since the issue here is that of a possible trade-off between nuclear weapons and conventional forces. By 1960 the United States of America and the Soviet Union had both developed hydrogen bombs and the missiles with which to deliver them, the British military had also built their hydrogen bomb, while their French counterparts had atomic bombs.

From this period onwards the effective destructive power or "lethality" of the nuclear weapons available to these nuclear weapons states increased dramatically. Lethality is a scientific measure of the effectiveness of a nuclear weapon system, based on combining the "yield" or strength of the explosion such a weapon produces and the accuracy with which it can be delivered to the target. A smaller explosion closer to its target can do more damage than a big explosion that is far from the intended target.

If those who argue for cheap nuclear security are correct in their understanding of the linkages between nuclear weapons, security, and the size of conventional armed forces then as lethality increased, security increased and conventional forces should have been reduced. It therefore seems reasonable to examine whether the US led-nuclear alliance (NATO) and the Soviet-led nuclear alliance (Warsaw Pact), whose war fighting plans were based on possession of nuclear weapons did in fact reduce their conventional forces, as the lethality of their respective nuclear arsenals increased through the 1960s, 1970s and 1980s.

Ruth Leger Sivard's compilation, *World Military and Social Expenditures 1993*, provides figures for the size of the armed forces of "the developed world" for this thirty year period. It is reasonable to use these figures because the overwhelming majority of these forces belonged to NATO and the Warsaw Pact. In 1960, there were, according to Sivard, about 10,151,000 members of the armed forces of the "developed world". In 1970, this figure was 10,428,000. By 1980, there were 10,157,000 and in 1990 these armed forces comprised 9,951,000 people. This amounts to a reduction of less than 2% over this thirty year period. Clearly, despite thirty years of reliance on nuclear weapons - with incredible increases in the lethality of their weapons systems - the nuclear alliances did not substantially reduce their conventional forces.

Similarly, there is little evidence for any comparable assertion that there are any long-term reductions in military expenditure in the wake of developing a nuclear weapons system. According to Sivard, military expenditures for the "developed world" for the same period as above - 1960 to 1990 - shows that spending increased consistently. In fact, it nearly doubled, going from 295 billion dollars in 1960 to 557 billion dollars in 1990 (in constant 1987 US dollars). There seems to be little economic gain to be had from building nuclear weapons systems.

Indeed, the very notion of a "peace dividend" - prevalent today in the United States and Europe - reflects just this fact in the form of a common understanding that the confrontation between the two nuclear-armed superpowers had imposed an unprecedented and massive drain on their resources. The peace dividend, if it ever comes about, will be a result not of "cheap nuclear security", but because the USSR dropped out of the arms race.

There is a limited amount of information about Pakistan to test the claim of "cheap nuclear security". If the impressions that have been created by senior military figures about the development of Pakistan's nuclear weapons are taken as credible - that is, if we are to believe that

Pakistan's threats to use nuclear weapons in 1987 (in response to the Indian military exercise "Brass Tacks") and again in May 1990 were based on fact, rather than hot air and bluff - then surely defence spending could have been reduced from 1987 onwards.

A quick look at defence spending from then to the present should show "substantial" reductions. Defence spending for 1987-1988 was about 26% of total (current and development) expenditure, in 1988-1989 it was 25.5%, and in 1989-1990 it had increased to 26.5%. Defence spending fell to about 25%, and then to 24%, in the two subsequent years, but for 1992-1993 it was 28.7% of (current and development) expenditure, for 1993-1994 it was 27%, and the present 1994-1995 budget is for 26.4%. Eight years after the nuclear capability is supposed to have been achieved, defence takes a bigger share of the national wealth.

While the governments of India and Pakistan claim to have "nuclear capability", their conventional arms race is actually showing signs of speeding up. Pakistan has recently bought submarines worth US$ 950 million from France (*The News*, September 22, 1994) and six 25-year old British war ships which together with upgrading will cost over US$ 1 billion (*The News*, October 23, 1994). Meanwhile the Indian navy is pursuing "nuclear-powered submarines with a capacity to launch ballistic missiles" (*Dawn*, February 20, 1994), and a new aircraft carrier (*The News*, February 22, 1994). India's defence budget for 1994-1995 shows a massive increase of 38 billion rupees, to a total of 230 billion rupees (*The News*, March 1, 1994). For its part, Pakistan's defence budget for 1994-95 now stands at 102 billion rupees, or 34.5% of total current expenditure - clearly an increase rather than a decrease over last year's budget. It would seem then that "nuclear capability" of any kind does not help cut defence spending.

This is not a new conclusion. Over twenty years ago a special study group for the Secretary-General of the United Nations (*Basic Problems of Disarmament*, Reports of the Secretary-General; United Nations, 1970) asked the question: what have nuclear weapons contributed to military power? Their answer is worth quoting at length. They said that as far as the superpowers were concerned, having nuclear weapons had "not made it possible for either to reduce their military expenditures in general or to neglect the effectiveness of their conventional armoury in particular". They noted that this also applied to Britain and France. Even more damning for the proponents of "cheap nuclear security" is the UN group's conclusion that "since the end of the Second World War, no nuclear weapons state has been able to derive any immediate military advantage from the possession of nuclear weapons".

The Real Cost of Nuclear Weapons

The third part of the argument for "cheap nuclear security" tackled here is the claim that nuclear weapons in themselves are cheap, even for poor third world countries like India and Pakistan. What is clear from the outset is that the narrow economic costs and implications of

trying to build "nuclear security" vary depending on the base from which any particular state starts. Neither the hidden social and human costs of the lost opportunities for building schools, hospitals, water and sewage systems, etc., nor the long-term effects of exposing people and their environments to processes involving radioactive materials are included here.

To build nuclear weapons requires production of the material for the nuclear bombs (either enriched uranium or plutonium), the assembly and testing of such a nuclear weapon, and, of course, the development of a delivery system, such as missiles or aircraft, which can take these bombs to intended targets. In the case of Pakistan, which has followed the uranium path to nuclear weapons and is developing missiles, this has called for capital investment in facilities for uranium mining, processing, and enrichment as well as in the capability for bomb and missile design, manufacture, testing, storage and maintenance. It requires physicists and mathematicians, chemists and metallurgists, and engineers of every kind, to say nothing of skilled workers, electricians, welders, metal workers, etc. These are all skills that are not easily available here, or in any other third world country.

However, an estimate of the narrow monetary costs of a nuclear weapons programme undertaken by a third world country is available. The details of the Iraqi nuclear bomb programme have been made public by the International Atomic Energy Agency inspectors sent in to uncover it after the Gulf War. Trunkfuls of secret files from the Iraqi Atomic Energy Commission allow analysts of nuclear programmes to assess the likely expenditures as somewhere between US$ 5 billion and US$ 10 billion. This, it must be remembered, is for a programme that was a few years away from producing a bomb. It seems reasonable to assume that for Pakistan a complete, but "basic", or "first generation" nuclear weapons system (one that could be used, rather than hinted at) would cost closer to US$ 10 billion.

This estimate accords reasonably well with Bhabani Sen Gupta's estimate in 1981 that a simple nuclear weapons programme would have cost about US$ 5 billion then. Allowing for an average annual rate of increase of prices in the economy of Pakistan of about 7% during the 1980s means that, on average, things are nearly two-and-a-half times more expensive now than they were in the early 1980s. But it is also well known that the rate of inflation for military production and services is substantially higher than the average rate of inflation for an economy as a whole. So the US$ 5 billion that a simple nuclear weapons system would have cost at 1981 prices becomes US$ 13 billion if it was spent today, assuming that military inflation is 10% higher than in the rest of the economy. Incidentally, no allowance is being made here for the cost overruns, commissions, and corruption that characterises military spending the world over.

It is possible to get a better sense of the sums involved by spreading the total cost over the duration of a nuclear weapons development programme. For the Pakistani nuclear weapons programme, a plausible figure may be 15 to 20 years. That is assuming the programme started sometime in the early to mid-seventies, and was substantially "frozen" or "capped" in the late

eighties. The initial expenditures were probably made following Zulfikar Ali Bhutto's decision in 1972 to start the bomb programme, while the really major purchases (from abroad) for setting up uranium enrichment at Kahuta began in about 1975, and most of the facilities began operating in the early 1980s (see *Nuclear Ambitions* by Leonard Spector, 1990).

A sensible end point to adopt for the active - and expensive - part of the bomb-programme may be the decision, taken in 1989, to suspend this uranium enrichment activity. The Hatf I and Hatf II missiles, possible nuclear weapons delivery systems, were tested in 1989. How much was achieved during this time can be gauged from the statements by senior Pakistani political and military leaders (if they are to be believed) that by 1987, they not only had bomb-grade material, but had a "nuclear capability" able to function as a "deterrent". Dividing the total estimated cost of some US$ 10 billion by this 15 to 20 year time frame suggests "the bomb" would have cost Pakistan from US$ 500 to 700 million a year, that is about 15 to 20 billion rupees a year (at current prices), for 15 to 20 years. To illustrate the size of this expenditure it only needs to be stated that Pakistan's present defence budget for 1994-1995 is about 100 billion rupees.

No discussion of nuclear weapons can be complete with mention of the delivery system. A nuclear bomb is a payload, it needs to be delivered to a target before it actually constitutes a weapon. The design and production of delivery systems is not specific to nuclear weapons, but these weapons do place some constraints on delivery systems, and the military structure in which they are integrated. In particular there are the issues of safety, accidental detonation, etc. during storage at, and in transit to and from military installations. But, briefly, a delivery system requires, in addition to the delivery vehicles themselves, dispersed bases or launch sites, support systems (maintenance, logistics, perimeter security etc.), as well as command, control, and communications infrastructure. There will also be a need for early warning systems, and air defences, both aircraft and anti-aircraft missiles.

Missiles are widely as seen as the quintessential delivery systems for nuclear weapons. This is the crux of the importance of missiles. Missiles in themselves are not weapons of mass destruction, it is the payload, the kind of bomb, that they carry which matters. The available evidence from wars in which missiles with ranges of several hundred km) with conventional payloads were used, for example the Iran-Iraq war, and the Gulf War, suggests that these missiles do not significantly affect the result. One analysis in particular has studied the casualties and damage to buildings suffered by the Israeli city of Tel Aviv, from Iraqi Scud missile attacks. The average number of people injured by each Scud missile was between four and five, while about 250 buildings were damaged.

There are three features of missiles that comprise the standard arguments in favour of them as delivery systems, particularly for nuclear weapons. The first is that because of their speed there is little possibility of defence against an attack with missiles. That is, compared to

military aircraft, the chances of detecting, intercepting and destroying a missile are small. Any weapons system that includes a missile as the delivery vehicle is therefore likely to be more effective in reaching its target. The second feature that is supposed to give missiles a military significance is also related to their speed. The relatively short time they take to get to their target compared to aircraft means that they allow for a more rapid response to any particular situation. The third advantage that missiles are supposed to confer is that because they are often small, mobile, and require no runway for take-off they are more easily protected than military aircraft. This relatively lower vulnerability means that missiles are less likely to be destroyed in a surprise attack.

It is also precisely these features that make missiles a source of dangerous instability. The way the instability works is as follows. The short time a missile takes to travel to its target means that a surprise attack can be very sudden, leaving little time for planning a thoughtful response. The military solution to this is to develop the means to withstand such an attack and to be able to respond rapidly if such an attack starts. The key factor becomes speed. This motivates attempts to protect "your" missiles and to attack "their" missiles before all of them can be launched.

To do this missiles have to become very accurate, because missiles are so easy to protect. As the accuracy increases the chances of being able to destroy "their" missiles increases. But then "they" will see this as an increased threat to "their" missiles from a surprise attack. This is known as the "use them or lose them problem". And "they" too will take action, to launch "their" missiles when they have a warning of an attack. This launch-on-warning strategy reduces the time for decision making effectively to zero.

Irrespective of the nature of the warheads, missiles have large infrastructural and technological demands of their own. From design and production facilities to maintenance and repair, fuel supplies etc. there will need to be a structure of engineers, scientists, skilled workers, experimental facilities, test sites, etc. The 1968 UN study suggested an intermediate range (greater than about 1000 km) missile programme would need 19,000 people, including 5,000 scientists and engineers.

In the context of South Asia, the emergence of a missile capability can be traced back to the early 1960s when the United States helped India set up its space programme, and the French helped Pakistan. In fact, India's first satellite launcher, that also forms part of their Agni intemediate range ballistic missile, has been described as "virtually identical" to an early 1960s U.S. rocket known as Scout. While Pakistan's Hatf 1 and 2 are said to be "copies" of French rockets. It has taken both countries nearly thirty years to make these copies.

The Indian Integrated Guided Missile Development Programme was set up in 1983 to coordinate the existing missile effort, with initial funding of 8 billion rupees. There are apparently 19 laboratories, 7 academic institutions, 7 government organisations, 21 public sector

industrial units and 6 private sector ones involved. After decades of work the technology has reached the point where there are three classes of missile available to the Indian military. There are two surface-to-air missiles (Trishul and Akash) for shooting down aircraft, an anti-tank missile (Nag), and two missiles launcheable from trucks for attacking targets on the ground (Prithvi and Agni).

The driving motivation for Pakistan's missiles is said to be the "threat" from Indian missiles, particularly Prithvi with its range of between 150 and 350 km, because it can, in principle, be fitted with nuclear warheads. Pakistan's response has been to replicate this capability. Pakistan's missiles consist of Hatf 1, with a range of 80 km, and Hatf 2, with a range of nearly 300 km, and a rumoured transfer from China of their M 11 missile system, with a range of 600 km. Presumably Pakistan's intention is to build missiles that can carry nuclear weapons further into India than the F-16 or the Mirage aircraft it already has. In other words missiles with ranges of about 1000 km.

It is worth remembering here that the cost of developing, producing and actually deploying such missile systems will be higher than that given for India earlier, because Pakistan has a weaker indigenous scientific and technological base, more of the components will need to be imported. Pakistan can, given its massive spending on the armed forces, probably afford to build and test a handful of missiles, but the price tag will be of the order of $3 - 5 billion, this is the estimated cost for the development of a 1000 km range missile. This was the price paid for the Condor 2 missile that Argentina, Egypt and Iraq tried jointly to develop, before it was discovered and the programme aborted.

For those in India and Pakistan who relish nuclear weapons, missiles to take them to their selected targets seem to be a must, even though nuclear weapons for missiles need to be more sophisticated than those that are to be dropped from an aircraft. A nuclear bomb has to be specially designed to fit into the small space in the missile, most of the space is taken up by the rocket fuel and guidance systems. Consequently, for the Indian armed forces, and those of Pakistan, the absence of a sustained programme of testing nuclear weapon designs means that any nuclear weapons they may have, and may want to attach to missiles, are likely to be more limited in their reliability.

Safety

It has to be emphasised that the costs outlined here do not in themselves reflect the actual resources that are needed for "nuclear security". An important consequence of pursuing such "security" is that the share of military spending it demands does not necessarily decrease once a nuclear weapons system has been developed. There are, for example, all the costs associated with making sure that the nuclear weapons that have been developed are reliable. They have to be safe

from accidental detonation, and properly maintained. After all, the whole point is for the bomb to go off when "The General" wants it to, and it is supposed to go off with a bang, not a whimper.

Particularly important are the major developments in safety features for nuclear weapons in the last twenty years, features that prevent accidental detonation if the bomb catches fire or is damaged in some way. A key feature is using insensitive-high-explosives, these are relatively insensitive to sudden shocks, and to heat, properties that mean they cannot go off accidentally and cause the bomb to detonate. Another feature is that the bomb should be one-point safe, that is it should be designed in such a way that if part of the chemical explosive does go off, the bomb as a whole will not detonate.

These cannot have been incorporated by India, or Pakistan, in their bomb designs. This is because the Indian government has only conducted one nuclear weapons test and that was twenty years ago, while Pakistan's bomb makers have not even done that. If it is true that Pakistan is using a variation of a Chinese-designed nuclear weapon, there is little room for complacency there either. The Chinese design they are reported to have was tested nearly thirty years ago, in 1966. In fact, the current Chinese nuclear tests are being justified on the grounds that Chinese weapons need to have such safety features built into them. The tests are supposedly to make sure that these changes do not affect the actual functioning of the bomb, to make sure it will still go off when it is meant to.

There is a high probability that accidents involving nuclear weapons will occur. Reports suggest that the design for the Iraqi atomic bomb, the only Third World bomb design about which there is any public information, was dangerously unstable. The United Nation's inspectors who studied the design are reported to have said that it "would be on the verge of going off - even while sitting on the work bench". Even countries with a track-record of nuclear weapons manufacture and deployment have these problems. The US had thirty-two "Broken Arrow" incidents, in which there has been substantial damage to the nuclear warhead or actual detonation of the high explosive trigger, between 1950 and 1980.

A basic precaution in the early US weapons was to keep the nuclear material separate from the triggering mechanism, the bomb was stored as a disassembled device and was only assembled after launch or after take-off in a plane. The times of maximum danger then became crisis situations, or exercises, where the bombs are prepared for delivery to a target. In one particular accident in 1961 an atomic bomb fell from an American bomber while it was in flight, when it hit the ground five of the six safety switches failed, it was pure chance that the sixth switch did not also fail. If it had, the bomb would have exploded over the US.

Since real bombs are not "wooden bombs" they age, and while they may have been reliable and safe on the day they were made, they may not remain either reliable or safe. They have to be designed to be robust. But there will always be small variations in the materials used and in the actual assembly, variations which are found in every mechanism. There are problems

of corrosion and material fatigue, and decay of the high explosive trigger, that increase with time. Sophisticated monitoring and maintenance capabilities are required to keep nuclear weapons within their limits of safety.

All nuclear weapons, irrespective of who they belong to, once designed and assembled, have to be tested, inspected, and maintained. For Pakistan or India to think about deploying their nuclear weapons - rather than just talking about them or sitting on them without knowing if they are safe and reliable - makes such procedures absolutely indispensable. A nuclear test is more than just setting off a bomb in a hole in the ground. A test is actually a very complex scientific experiment, and doing an experiment just once is bad science. A typical series of nuclear weapons tests in the early days of the US nuclear programme consisted of 20 test-explosions for each weapon design. These tests are not cheap; the current cost for one simple underground test explosion is US$ 30 million. The US Department of Energy requested US$ 428 million for 1994, just to maintain the infrastructure and capability required for nuclear testing. But these are the least of the costs associated with nuclear weapons testing.

The real consequences of nuclear weapons testing are to be found in large areas of Nevada (in the US; described in *Dead West: Ecocide in Marlboro Country* by Mike Davis) and Kazakhstan (the Soviet test site; described in *Test Anxiety* by Victor Kianitsa). These areas, described as "national sacrifice zones" by US officials, have become unfit for human habitation as a result of these test-explosions. In both areas there is radiation in the soil, in the food and in the water. Farmers commonly find that their livestock give birth to "monstrous offspring", such as "five-legged lambs", others just die "mysteriously." In Kazakhstan, milk in the test areas has up to 500 times the (officially) acceptable amount of radioactivity in it.

But it is the local people who are the worst affected. Around the Nevada test site, people now suffer from "cumulative cancers, neurological disorders, and genetic defects." Cancer is so common that almost everyone living there can recall "long lists of tumerous or deceased friends and family." Eyewitnesses have described people whose "hair was falling out and their skins seemed to be peeling off." And then there are the "jellyfish babies" born to women living in these areas; women who, after six months of pregnancy, give birth to what "looked like a bunch of peeled grapes."

It does little good to detonate the test-explosion underground. One out of every three underground Soviet tests threw radioactive dust and gas into the atmosphere. In about 30 tests these clouds were blown by the wind outside the test area into populated regions. The incidence of leukaemia has more than doubled in this area, while 95% of the children have anaemia, and there are villages with a death rate two to three times the average for Kazakhstan. The Soviet obsession with secrecy meant that "people living in this area died slow and horrible deaths from unknown illnesses - diagnosing radiation-related illnesses was forbidden." As many as 500,000

people are believed to have been affected by radiation from the Soviet nuclear tests in Kazakhstan.

The situation is little better in the US. An unpublished government report prepared during the 1970s estimated that 170,000 people had been poisoned with radioactivity - nearly everyone living within 250 miles of the Nevada test site. A further 250,000 US soldiers may have been exposed to radioactivity by US nuclear bomb tests, while as many as a million people have actually worked in the nuclear weapons plants. Ill-health among these workers is increasingly being linked to their jobs.

The intensely radioactive materials that form the core of nuclear weapons means that the bomb factories become so contaminated that, in time, they become unusable. The US does not actually have the capacity to make nuclear bombs as a result of safety and environmental problems in such plants. The cost of cleaning up the mess that nuclear weapons make is staggering. It is estimated that to clean up just the Hanford nuclear facility in the US, described as "the dirtiest place on Earth", will cost at least US$ 50 billion. The real costs may be much higher, as high as US$ 200 billion. What is already clear is that US$ 8 billion has already been spent on this, with "little to show." How contaminated Pakistan's nuclear facilities are, and how much will have to be spent to clean up the mess is completely unknown. But it will certainly not be cheap. This cost increases with every passing day that the nuclear programme is not stopped.

The Social Costs of Nuclear Security

It is hard to assess in detail the long-term costs to Pakistan of its nuclear programme. In particular, there are major questions about the real costs of Pakistan's search for "security." Firstly, there is the problem of information; details of the actual monetary expenditures by Pakistan on defence are not published. There are only a few lines here and there in the budget documents and economic surveys produced by the government, giving total military spending. Even the figures that do get published are of limited value: there is no mention of the nuclear programme at all. In any case, it is very likely that military expenditures, especially on the nuclear weapons programme, are given hidden subsidies from other sources. In fact, it is not even clear whether the nuclear programme is funded from the defence budget at all. Or who scrutinises the spending, whatever its source.

Some of this secrecy may be about to lift. It has been suggested that defence spending is to be discussed by the National Assembly. However, in the interests of democracy, the discussions are to be closed to the public and the press. It is easy to imagine what the debate will be like. The government will be resolute; it will claim guardianship of national sovereignty. It will say it is spending as much as it can, and as much as is necessary, on the military. Defence they will say in that time honoured phrase is their "highest priority". The opposition will be

insistent. They will scream betrayal, insufficient spending, and compromising of defence readiness.

Whatever the costs, the problems of finding the resources for an open-ended pursuit of "nuclear security" have been, and will be increasingly acute for Pakistan. For a poorly industrialised country like Pakistan such technology-intensive activity is necessarily reliant on imports - legal and illegal. This heavy spending fails to "trickle down" to the rest of the economy not only because so much of it is spent on imports, but unlike imports of machinery for factories, nuclear weapons related imports (in fact military-related imports in general) cannot produce anything that has economic value, anything that can be sold.

Except, that is, for exports of weapons to another country. Pakistan has, officially, earned nearly US$ 85 million during the last three years from military sales. This is frankly a tiny amount, nowhere near enough to cover the costs of military production. In fact, the official figures only give the income received from these sales, not the profit, if any, that was made. There is, therefore, a constant pressure to increase exports to pay for these economically unproductive military imports. These exports, by the way, also have to finance the massive debt repayments Pakistan has to make. For their part, the illegal imports are, naturally, bound to cost much more than they would if they were allowed.

What is clear is that the capital, and import, intensive nuclear programmes of third world countries naturally draw resources away from other areas of national expenditure. These are the social costs of "nuclear security". The irony is that paying for the nuclear weapons facilities and the engineers, scientists, and skilled workers to work in them, takes funding away from productive parts of society. In particular, there is a drain on the weakest parts of the social structure, the part that produces intangible things; the schools, colleges and universities. The very places in fact which train the bomb designers and builders, as well as other, more useful, people. In fact, in the broader picture, these are the costs of seeking military solutions to political problems encountered in international relations. These are costs that have to be included, especially when looking at South Asia.

In Pakistan, there is not much of an educational system; what there is seems to be in terminal decline, and the general unavailability of investment in people, and things, for creating a modern society with a modern economy, is a profound cause for concern. For this country the burden of foreign debt and military spending is such that almost nothing is left over for policies of welfare, equality or social development.

It is worth making a direct comparison between how much this government intends to spend on its five year Social Action Programme with the amount that has been spent (is still being spent?) on nuclear weapons. A total of 102.423 billion rupees is to be spent between 1993 and 1998 on basic education, primary health care, nutrition, population welfare, rural water supply and sanitation, and on research and monitoring for the programme. One way to break this

down is to divide it by the number of years the programme is to run for, and get an average annual expenditure. It comes to just over 20 billion rupees a year. In other words a figure similar to that which successive governments have been spending on developing nuclear weapons.

What exactly can a government achieve with 20 billion rupees a year? The targets that have been set for the Social Action Programme are very precise. Primary education is to be expanded such that it covers 87.7% of the population in five years time, an increase of nearly 10% from the present coverage of 68.9%. The increase is intended to be particularly targeted at girls. The proportion of girls with access to primary education is to increase from the current 53.7% to 81.6%. Similarly for adult literacy. This is to increase from 38% to 53%. The figure for women nearly doubling from its present 25%, to 40%. Immunisation is proposed to increase from 80% of the population to 90%. While life expectancy is projected to increase from 61.6 years to 63.6 years for men, and from 61.2 years to 63.6 years for women. The fraction of the rural population with access to water supply is targeted to increase to over 70%, while those with access to sanitation is to increase to 31.5%. The use of contraceptives is intended to double, to about 28%. The rate of population growth is supposed to slow down because of the spending on the Social Action Programme to 2.7% from the present rate of 2.9%. Improvement in the quality of life cannot be adequately reflected in such statistics, but at first sight it would appear that for the overwhelming majority of the people of Pakistan the aim is certainly to make their lives much better. All this could have been done 15 years ago, with the same amount of money, money that was obviously there to be spent, but was instead spent on the nuclear programme.

Who Benefits?

Given that all these facts are there in the public domain, and it only requires a willingness to seek them out, the obvious question is why there is any support at all for the nuclear weapons option, especially among military planners and the strategic studies community, in Pakistan. It is useful to look at the arguments put forward by General (retired) Mirza Aslam Beg, former Chief of Army Staff, one of this country's leading advocates of the nuclear option.

In one of his articles (*The News*, January 2, 1995) General Beg explains the reason why Pakistan has pursued nuclear weapons. He argues that Pakistan's nuclear weapons programme was a response to "geopolitical ambitions emanating from the deeper recesses of the Hindu psyche." It was, he says, "not an act of choice, but of compulsion"; Pakistan was forced to follow where India led. This involved "colossal hardships", but after having overcome these, and attained a "nuclear capability", there is no way that it should be given up. In a revealing turn of phrase he equates giving up this capability to "nuclear castration".

Rather than succumb to the temptation to explore the "deeper recesses" of General Beg's psyche, there is one particular issue he raises that needs to be addressed. It is the notion that the

conflict between India and Pakistan is fundamentally unlike the conflicts between other states. Pakistan, in his view, is not faced with a normal neighbouring state. Normal states have conflicts of interests, territorial disputes etc., from time to time, but Pakistan is up against a state whose actions are not the result of rational, if misguided, assessments of its national interest. It faces a state whose international relations are guided by the "deeper recesses of the Hindu psyche."

It is not surprising that he should describe it this way. A large part of his argument is an attempt at explaining why Pakistan has been compelled to turn to nuclear weapons. It is because of India. The two reasons he gives are the conventional ones; the military superiority that India has in terms of soldiers, tanks, planes etc., superiority it always has had, and India was first to take the decision to acquire nuclear weapons. In why this happened he cites the model of "initiator" and "resistor". An "initiator" country develops nuclear weapons because it is driven by "motives of power" to be "macho" and wants to "intimidate" and "control" its neighbours. A "resistor" country responds by also developing nuclear weapons, but only to "safeguard its integrity." This amounts to no more than the big bad bully against the plucky little guy who won't give in to threats, and there are no prizes for guessing which South Asian country fits which role - so much for the intricacies of strategic thought!

This model is not unique to South Asia. General Beg draws comparisons with South America; there Argentina played the role that India is supposed to play in South Asia, and Brazil stood in for Pakistan. What the General fails the inform the reader of is that while Argentina and Brazil rejected the Nuclear Non-Proliferation Treaty (NPT) because it was discriminatory, and did set up secret nuclear weapons and missiles programmes, this was largely due to military dictatorships. The relationship between the military an, and things there have changed because of the return of politics, and democratically elected politicians. But it has only been determined and bold political vision that has carried these countries through the intervening period of transition from military to civilian rule. A former Brazilian minister of Science and Technology has described how "military groups thrived on the secrecy surrounding nuclear activities and used information on alleged activities in the other country to obtain more resources from their own government." These military groups went so far as to start digging the tunnels for testing nuclear weapons.

The change which has taken place in South America is breathtaking. After twenty years of mutual suspicion and covert nuclear weapons programmes, Argentina and Brazil not only have a Joint Committee on Nuclear Policy where the respective atomic energy commissions discuss safety issues, but a wide-ranging bilateral set of agreements that include no nuclear test explosions, and checks on each others nuclear facilities which amount to a local NPT. Their respective Presidents have even visited each others once secret nuclear weapons facilities. The change that democracy has brought has been so great that Brazil, the once "resistor" country, has

written in to its constitution that "all nuclear activity in the national territory will only be admitted for peaceful purposes". Perhaps there is a lesson in this for Pakistan after all.

It should be clear by now that "initiators" and "resistors" are not necessarily trapped in a condition of perpetual hostility. Space for breaking out of military obsessions with threats can be created, because these obsessions are usually self-serving -a fact admitted by military planners around the world except when it comes to their own plans. The only way to keep this space closed is to attribute the source of conflict to something dark and psychological, something intrinsic to the other - an attitude summarised perfectly by former US President Ronald Reagan's description of the Soviet Union as "the evil empire." Given this attitude, the cold war was necessary, it was the only way to contain the latent geopolitical ambitions emanating from the deeper recesses of the Soviet psyche (to borrow a phrase from General Beg).

What is disturbing is that General Beg should resort to the same kind of thinking as Ronald Reagan. He is after all a former Chief of Army Staff, not an aged Hollywood has been. If General Beg is serious, and the conflict between India and Pakistan is in fact located in the Hindu psyche, then there is no avoiding the conclusion that the hostility this creates will persist as long as India is a largely Hindu country. In other words, forever. The appropriate plan in this eternal struggle between the irrational, hegemonic ambitions of the Hindu psyche on the one hand and General Beg and his friends on the other is to rely on nuclear weapons as a way to prevent this hostility becoming war. In a word, nuclear deterrence. A conventional war is to be postponed, because it will be come nuclear, and using nuclear weapons would be so horrific that neither country would start a war. Simple!

It is also self-serving, because as war is postponed by deterrence, so is peace. In deterrence theory there are no winners and losers, neither country can ever claim victory. But, and this is the darkest secret of deterrence that makes it so attractive to military planners around the world, there is no basis for the resolution of conflict. This suits General Beg just fine. An endless hostile relationship between India and Pakistan, created and maintained by deterrence, would only prove to him that the two countries could never come to some acceptable accomodation, which was the starting point of his argument. It also becomes obvious who benefits from the maintenance of hostility between Pakistan and India, and the attendant emphasis on national security and requirement for high military spending. Deterrence keeps soldiers in work, irrespective of the damage done to the nation as a whole. .

In the world inhabited by experts on strategic theory, this is an acceptable situation for a country to be in. In strategic thinking there are only military capabilities and threat perceptions and if these can balance each other out, there is stability. But it is a stability of fear and menace; like two gunfighters staring at each other down some lonely street, eyes locked on each other, hands clawed to draw and shoot their pistols, each waiting for the edge that will give them an advantage. It is a stability on the edge of an explosion.

The situation is supposed to stay on the edge because of the logic of deterrence. This logic rests on two assumptions. The first is that the attacker (for General Beg this always means India, even though it is Pakistan that has started the wars between the two countries) must realise that the attacked (Pakistan) has enough of a nuclear capability to inflict unacceptable damage. That is India must be made to believe it is not worthwhile to attack in the first place. The second assumption is that the attacker must realise the attacked is willing to use this capability. In other words India must be made to believe Pakistan can and will use nuclear weapons against India. In effect this means it is not Pakistan that decides whether its nuclear weapons constitute a deterrent, but India.

Because deterrence is in the eye of the "other" state, and its military planners, it is unstable. Pakistan can never be sure that India sees its nuclear capability as a deterrent. And this lack of confidence drives the arms race. In 1994 Pakistan's sense of insecurity, despite its nuclear capability, led it to purchase $1 billion worth of French submarines, spend $1 billion on the renovation of six ageing British frigates it had bought, and sent its diplomats and ministers desperately running from pillar to post (Russia, South Africa, China...) for more weapons. This is to say nothing of the seemingly endless struggle to get the $1 billion worth of F-16s and assorted military hardware from the US. All this indicates just how insecure Pakistan is about the value of its nuclear capability a deterrent.

This uncertainty about whether nuclear deterrence actually exists between Pakistan and Indai can be found even within Pakistan's military establishment. In a recent article, *Nuclear Deterrence and National Security* (National Development and Security, Vol. II, No. 3, Feb. 1994) Rear Admiral (retired) S. W. Haider, the former Chief Instructor at the National Defence College concludes that "our so called nuclear capability has served us politically but to consider that it is a deterrent against India is not true."

The Ultimate Costs of Nuclear Security

It is clear that the supporters of the bomb start from the presumption that animosity between India and Pakistan is inevitable, that war is always likely. It is also clear that nuclear deterrence is a very weak and uncertain doctrine for India and Pakistan, it is likely to fail and war is possible.

Imagine that war starts. The first significant fact is that India now has the fourth largest army in the world, and Pakistan only the seventh. The Indian overwhelming conventional military superiority defeats Pakistan's armed forces. Then what? Presumably Pakistan unleashes its nuclear weapons. It will do so first because the Indians will have no need to use their nuclear weapons. That this eventuality is in the minds of the Pakistani decision makers is evident from

their refusal to agree to the Indian proposal for a declaration not be the first to use their "nuclear capability". So what happens next?. This depends on Indian nuclear strategy.

The former Indian Chief of Army Staff General K. S Sunderji has offered an insight into a likely Indian nuclear doctrine (*The Hindu*, September 16, 1994). He suggests that it be "based on declared No First Use and a second strike on a handful of cities of the adversary in retaliation of the first strike." In other words, let Pakistan use nuclear weapons first, then hit back even harder. He goes on to describe exactly what he see happening; "three 20 kiloton warheads for each city target". Being a realist and knowing that untested or partially tested bombs are hardly going to be reliable, he says that if "in some cases only two are available and if only one successfully detonates on the target, it might still be acceptable." After all, he points out, "Hiroshima and Nagasaki got only one each."

The terrible effects of a nuclear explosion are now well known. At the moment that the bomb explodes there is a tiny ball of material that has a temperature and pressure found otherwise only in the centre of the sun. In less than a thousandth of a second the temperature falls to 300,000 degrees centigrade, and a shock wave, a shattering blast of air, travelling faster than the speed of sound is created. Along with these there is a strong electromagnetic pulse, a burst of "static" like that produced by lightning.

The fireball goes from giving out X-rays, to becoming a bright light as it cools, and then becomes heat. The X-rays are lethal, the light causes blindness, the electromagnetic pulse damages all unprotected electrical and electronic equipment, and the heat starts raging fires. These effects, combined with the shock wave and subsequent hurricane force winds able to flatten buildings, are devastating. The range of devastation is extensive even for a small and primitive nuclear weapon, the evidence from Hiroshima of fatalities, injuries and damage to buildings shows massive destruction out to several kilometres from the centre of the explosion.

There have been some simple calculations of what would happen if India and Pakistan actually used the kind of nuclear weapons they are believed to have - the same kind of bombs as those the US used to destroyed Hiroshima and Nagasaki. The results were calculated assuming that the bombs were intended to destroy military targets in cantonments, and were therefore exploded close to the ground, rather than high up in the air. The estimated immediate deaths, injuries from blast and the area over which property would be destroyed for some major Pakistani cities, if just one bomb were dropped on each city, are adapted from S. Rashid Naim : "Aadi Raat Ke Baaad" (in *Nuclear Proliferation in South Asia*, edited by Stephen Cohen, 1991). For comparison, the total number of military deaths in the last war between India and Pakistan was about 11,000.

City	Immediate Deaths	Injuries	Area Destroyed

Karachi	130,000	210,000	6 square miles
Lahore	65,000	11,000	6 square miles
Rawalpindi	70,000	11,000	4 square miles

The actual figures are likely to be substantially higher. Given the poor state of medical facilities in Pakistan even in peace time, and that the hospitals, doctors and nurses would also be victims in a nuclear exchange, it is reasonable to suppose that most if not all of the injured would also die, slowly over time, from a lack of adequate medical attention. The destruction of urban infrastructure, roads, water supply, gas and electricity, as well as the failure of electrical and electronic equipment, to say nothing of a collapse of civic administration would massively hinder any efforts to recover from such a calamity. Even if only one city were attacked, the resources of the rest of the country would not be adequate to cope with the destruction.

There is one other feature that is characteristic of nuclear weapons that would make the situation indescribably worse. Accompanying a nuclear explosion's heat, shock wave and electromagnetic pulse are tiny radioactive fragments created by the explosion - this is known as "fallout". These fragments are carried up into the air and spread by the wind to cover large areas. If an atomic bomb is exploded close to the ground then large amounts of dirt are thrown into the air and mix with these radioactive fragments, which eventually fall back to earth as a black rain and contaminate everything they come into contact with.

The evidence from Hiroshima is that a few days after exposure to the radiation from an atomic bomb explosion people will begin to suffer radiation sickness, they will show symptoms of nausea, diarrhoea, dehydration, loss of hair, and increasing sensitivity to infections. Large numbers of those exposed will begin to have internal bleeding and will die. Many will suffer certain death within a few days. There are also longer term fatalities due to the increased incidence of cancer. The evidence from Hiroshima is that out of the 300,000 people exposed to the explosion between 130,000 and 150,000 died within six months, a further 50,000 to 70,000 died within five years as a direct result of the explosion of one small atomic bomb.

The population of the large cities in Pakistan that will be exposed to fallout that will kill them within a few days of being exposed has also been estimated. In Lahore, there would be at least 240,000 people and in Rawalpindi about 180,000 who would die from radiation sickness, following from just one bomb being used against each city.

The effects of fallout, carried by the winds across large areas of the country, would be to poison the land by radioactivity, crops and livestock would be severely affected, surface water for irrigation and drinking would be contaminated, while industrial production, which is largely urban, certainly would be decimated. At a conservative estimate all the "development" that has

occurred would be undone within the first few hours of nuclear exchange between India and Pakistan. It would be a tragedy of historic proportions.

The Nuclear Arms Race and Fall of the Soviet Union: Some Lessons For Pakistan

Dr. Inayatullah

Introduction

During the last martial law a "consensus" was imposed from the top on the people that the country should acquire a nuclear weapon capability without debating the issue in public, on television or in newspapers. By the time martial law was lifted it had become an article of nationalistic faith, fortified by slogans of a heroic struggle against Indian expansionist designs and American imperialism. The "consensus" was further protected by unfounded allegations and insinuation that those who questioned it were unpatriotic, Indian or American agents, or both, and received funds from abroad.

As the need for a sound policy on this issue has become urgent for the survival and development of Pakistan, it must be thoroughly and courageously debated and, if reason dictates it, then nuclear policy must be changed. It is argued here that the attempt to possess nuclear weapons or at least nuclear weapon capability has already dragged Pakistan into a nuclear race with India. Both sides after acquiring nuclear capability for a certain number of weapons are now engaged in improving their delivery capacity with better and advanced missile system.

Due to its weak economic, scientific and industrial base and lack of self-sustaining indigenous nuclear and missile technical capacity, Pakistan is unlikely to achieve and maintain a reasonable parity with India. Our military strategists would regard this parity as necessary for deterrence, even if Pakistan spends considerably more resources on it. India can deliberately accelerate the race to pauperise Pakistan, and thus achieve its presumed goal of disintegrating Pakistan without firing a shot as the US did with the USSR. Some statements of Indian hawks like Subrahmanyam, encouraging Pakistan to explode a nuclear device, may be an attempt to lure us into such a destructive race.

Initiation and Escalation of the Superpower Arms Race

In a short span of time three dramatic changes have occurred in the Soviet Union; the fall of Communism, the erosion of its status as a super power, and its dissolution as a multinational state. Why and how it happened are questions which will remain on the agenda of world intellectual community for quite some time. The analysis here is focused on one question; what

contribution did the arms race, both conventional and nuclear, between the Soviet Union and US make to the decline of this once powerful state? Besides being of academic interest, the analysis will hopefully initiate a debate and create some public awareness of the consequences of a similar arms race between Pakistan and India.

The arms race between the Soviet Union and the West started with the 1917 communist revolution. The Western powers attempted to undo the revolution through all means, including military ones. Antagonism between the two temporarily subsided when Germany attacked the Soviet Union during the Second World War, and the Soviet Union joined the Western alliance to defeat Germany. As war neared its end, the Western powers led by the US and Soviet Union rushed to capture as much European territory as they could. The traditional antagonism between the West and the Soviet Union re-emerged.

The Soviet Union sought the status of a superpower at par with the West, led by the US. This obliged it to maintain a high level of conventional defence forces, provide economic aid and military assistance for protection of its allies, and suppress any movement for independence within the Soviet Union itself, as well as in the Warsaw Pact. It also continued its policy of exporting socialist ideology. All these policies had their economic cost, including a substantial rise in Soviet defence expenditure.

What made the defence expenditure of the Soviet Union skyrocket was it's decision to go nuclear, after the US had made a breakthrough in nuclear technology and demonstrated its destructiveness by using it in Japan. This started the nuclear arms race between the two super powers which went roughly through three stages. First was the stage of achieving a stable deterrence, and parity in defence preparedness, aimed at preventing the adversary from launching a nuclear attack out of fear that it would suffer as much damage as it would attempt to inflict. In the second stage, the objective became to absorb the first attack and then launch a debilitating counter attack. In the third stage, it became the incapacitation of the adversary before it could launch a nuclear attack. The US Strategic Defence Initiative (SDI), popularly known as Star Wars, aimed to destroy Soviet nuclear weapons before they reached their targets.

In pursuit of the escalating goals in the first two stages, both superpowers increased the size of their nuclear arsenal, improved its destructiveness, and the precision of their delivery system. This is shown by the chronology of development of nuclear weapons and delivery systems. The US exploded an atom bomb in 1945; the Soviet Union in 1949. The US developed intercontinental bombers in 1949 to deliver its nuclear weapons to the intended target. The Soviet Union developed such bombers in 1955. The US went for a more deadly hydrogen bomb in 1954. The USSR responded by testing the same type of bomb in 1955. The USSR developed the Inter-

Continental Ballistic Missile in 1957 and the US followed by developing its own in 1958. The USSR developed an Anti-Ballistic Missile system in 1968, the US started producing them in 1972.

The escalation of the nuclear arms race between the two superpowers is also shown by the growing number of strategic nuclear weapons they acquired. In 1962, the US possessed 2000 such weapons while the USSR possessed only 70. By 1972 the gap was narrowed; the number for the US rose to 5700, and for USSR to 2500. By 1982 the gap had further narrowed; the US had 10,000 and the USSR 7400 weapons.

The race in the 1980s reached a stage when the US, seized with the obsession to have a decisive edge over the Soviet Union, planned the deployment of SDI. Crushed by the heavy burden of military expenditure, particularly after its intervention in Afghanistan, and a sluggish economy, the Soviet Union found it difficult to develop and deploy a system similar to SDI. With this it lost not only the arms race, but much more.

The rise in the number and sophistication of nuclear weapons did not lead either of the superpowers to reduce the defence expenditure on conventional arms. Instead of becoming substitutes the two systems became complementary. The greater the expenditure on the one the greater the expenditure on the other. This is shown by two indicators. With the acceleration of the nuclear arms race, the defence expenditure of the USSR and US rose between 1950 to 1980 by about 300%. Second, the ratio of defence expenditure to GNP rose to 7% for the US and about 12% (and according to some estimates up to 25%) for the Soviet Union. This defence burden was too crippling for the Soviet Union compared to the US. The former's GNP was smaller than the latter's, estimates vary from 66% to 14%.

Further, a capitalist US made a profitable business out of its armament industry by exporting its obsolete arms to the Third World. This enabled it to keep its crisis prone capitalist economy going. The socialist Soviet Union also exported arms, though on a smaller scale than the US. However the arms were sold at cheap rates, and on credit which was repaid only partly and in some cases not at all. Consequently, the Soviet armament industry did not stimulate or benefit the economy to the extent the US armament industry managed.

What Sustained the Arms Race?

Once the arms race started between the two superpowers it could not be terminated even when the its disastrous consequences were becoming obvious. There emerged a military-industrial complex in the US, and a party-military complex in the Soviet Union. Both benefited

from the continuation of the arms race. As they acquired direct and indirect political power, there was no pressure from the public, particularly in the Soviet Union, to deter them from pursuing the arms race.

To impart legitimacy and "rationality" to the arms race the military-industrial and party-military complexes developed an ideology or a closed and one-sided intellectual discourse exaggerating the threat to national security and national culture. In the case of the nuclear arms race a theory (whose validity is examined later) that the mere possession of nuclear weapons prevented their use, and ensured peace, was advanced and a blind faith in its efficacy inculcated. The enemy was stereotyped and dehumanised, turned into a beast whose expansionist designs needed to be checked.

As the class or the institutions with material interests in the continuation of arms race came to play an increasingly dominant role in national decision making, and perceptions about enemy intentions and security threat became rigid, alternatives to the arms race such as bargaining, negotiations and compromises were fore-closed or became mere diplomatic rituals. The race was eventually lost by the Soviet Union to its adversary - the US - as it suffered from certain economic and political disadvantages discussed below.

Why the Soviet Union Lost the Arms Race

Although the American economy also suffered (and is still suffering) from the effects of the arms race, the Soviet economy suffered more due to its lower economic capacity to bear the military burden imposed on it. The reasons for this lower capacity can be found in the history of the process of Soviet economic development. There seem to have been four crucial factors.

First, the Soviet Union was a late comer in the field of development - which had started in the West and the US in the 18th and 19th century. The communist revolution of 1917 indeed accelerated the Soviet pace of development, turning it into an industrial and modern society. However, the Stalinist brand of socialism with a rigidly planned command economy also created economic inefficiencies and wastage. Added to this, as mentioned earlier, was the crippling burden of its internal and foreign policies.

Second, being part of the war arena in the Second World War, the Soviet Union suffered a devastation which the US did not experience. Moreover, unlike Europe, the Soviet Union had no external source of assistance to rebuild its economy after the war.

Third, though Communist revolution, as an indigenous movement initially released some of its creative and productive energies, under Stalin it gradually turned into an economically

inefficient and politically repressive system. A system of extracting huge surpluses from the people, demanding heavy sacrifices without offering adequate rewards. The party-military complex blinded by vested interests and ideological blinkers did not permit the system to become a participative and democratic one. With the ushering in of the information revolution the Soviet society could not be kept closed as before. The demonstration effect of Western affluence and freedom started penetrating Soviet society and raising the level of expectations of the Soviet people, increasing their dissatisfaction with the existing system and its leadership.

The Soviet people who for decades bore the economic burden of the arms race without protest, refused to do it then. The Soviet elite did not foresee the consequences of their policies and did not make the necessary mid-course correction. For this, and other reasons, the authoritarian political system which prevented expression of dissent and dissatisfaction with the arms race by the people, and their priorities for peace and development, started cracking. However, by the time the voice of the people forced itself through the closed corridors of power, the Soviet Union had lost the arms race and with it the capacity to satisfy its people, and keep the multinational character of its state intact.

When Gorbachev appeared on the scene to reconstruct the system and reorient its policies, the decay of the system and the dissatisfaction of the people had reached a point of no return. Of course the process of disintegration was also facilitated by the efforts of the rival superpower which, since the communist revolution of 1917, and particularly since the end of the second world war, was determined to liquidate the Soviet Union - which it regarded as the "evil empire."

Finally, the Soviet Union even after communist revolution remained "a prison house of nations" as Czarist Russia was described by Lenin, or a "sack of potatoes", as Marx described French society. The communist leadership refused to see or acknowledge ethnic, racial and cultural divisions existing in a multinational state and society partly created through conquest. When the warden of the prison became a leader who refused to use repressive measures, the prison walls fell and the sack broke. The result is what we are seeing today.

Examination of the Theory of Deterrence

The oft-quoted deterrence theory which is used to justify the possession of nuclear weapons is of doubtful validity, as it is based on the questionable assumption that the fear of mutual assured destruction by these weapons prevents adversaries from using them. The decision about initiating a war is never a rational one and the consideration of being destroyed himself rarely deters a determined aggressor. Such decisions are frequently influenced and governed by

emotions such as revenge, humiliation, apprehension about the enemy getting stronger, conquest of lands and resources, urge for national glory or martyrdom.

Had human attitude toward war been as rational as assumed by the deterrent theorists then there would have been no war in history. If nuclear war did not occur during the last five decades it was because both superpowers remained busy in acquiring nuclear superiority hoping that they could develop a technology which could cripple the adversary's defences and would establish their exclusive supremacy. The pursuit of this goal prevented war. In the end the race was won by the US causing the disintegration of the USSR.

Even if it is assumed that rational calculation of mutual destruction prevented nuclear war and will continue to do so in future, the conditions necessary for making a rational decision about not launching a war - accurate information about the nuclear capacity and intentions of adversaries - are often absent. Even with superior intelligence the two superpowers made wrong assumptions about each others' intentions during the Cuban Missile crisis as the Moscow meeting of 1986 organised by McNamara revealed.

In the case of India and Pakistan, the information on which they often base their military moves is extremely poor and distorted. Pakistan's assumptions on which Operation Gibraltar was organised in 1965, that Kashmiris in Indian-controlled Kashmir were ready for liberation and that India would not cross international boundaries, turned out to be catastrophic. A recent meeting in Bellagio of Americans, Indians, and Pakistani academics, retired senior military leaders and diplomats, held to cross check their perceptions about Operation Brasstacks further confirms the unreliability of military thinking. With a legacy of deep hatred of a thousand years, accentuated by three wars and mutually distorted perceptions, eruption of an intended or unintended nuclear war between the two countries can become a real possibility.

Besides the reasons discussed above, nuclear war between the two superpowers was prevented because of an almost foolproof safety mechanism against accidental and unintended war. No such mechanism has been instituted between India and Pakistan. As came out during the Operation Brasstacks whatever direct contacts between the two militaries existed were used to feed misinformation further raising the risk of an unintended war.

The deterrence theory, in the exact scientific sense, is not a theory established after examination of all evidence. At best it is a plausible explanation and, at worst, a hunch of those who want to possess nuclear weapons for reasons other than their use for prevention of a nuclear aggression. An equally plausible hunch would be that the nuclear weapon states will not use these weapons against a non-nuclear weapon state, as has happened during the last fifty years. The US did not use nuclear weapons in Korea and Vietnam, even though in the latter case it

suffered a humiliating defeat. The American bombs dropped on two cities of Japan were unrelated to securing the surrender of Japanese forces.

Therefore, if this hunch is as plausible as deterrent theory (or hunch), then Pakistan need not possess a nuclear weapon for its defence against India, other more effective means could be developed. In any case India's irrational and vainglorious policy of possessing nukes and exposing its people to extreme hardships need not be emulated by Pakistan with an equally irrational policy, particularly when the cost of this irrationality to Pakistan is much greater than to India and will start having its effects on Pakistan sooner than India.

Lessons For Pakistan

Having shown the weakness of the argument that the possession of nuclear weapons by two adversaries prevents nuclear war, and that a nuclear race is lost by an adversary whose economy and society cannot bear the burden caused by such a race as long as the other adversary can, we now turn to the final question. If a nuclear arms race is initiated between India and Pakistan, which doubtless would hurt both, which one is likely to lose it? For this purpose we will draw upon the experience of the nuclear arms race between the Soviet Union and the US, while recognising that no two situations are exactly similar.

First, as was the case with the US and the USSR, one should not expect that if Pakistan explodes a nuclear device, or declares that it has one, India would freeze the process of acquiring or keeping only a few devices. Pressured by its own bomb lobby, who are eagerly waiting for Pakistan to declare that it has nuclear weapons, India would start a nuclear arms race similar to the existing conventional arms race. The race in developing more sophisticated missiles is already on, with India having an advantage over Pakistan. As was the case with the US vis-a-vis USSR, India has a lead of several years - maybe a decade - in nuclear research, though reportedly Pakistan is catching up. Given the magnitude of the lag, it cannot be bridged in a short time. Regardless, once India escalates the race further Pakistan also would be forced to escalate it just to maintain an effective deterrence, or risk losing the advantage of having a nuclear device.

It cannot be exactly predicted where this race would end and with what consequences. But lessons from the experience of the US and the USSR and a comparative analysis of the development of India and Pakistan suggests that Pakistan would more likely be the loser than India.

Second, the possession of nuclear weapons has not led to a reduction in the expenditure on conventional defence system, as shown by the experience of the US and Soviet Union. Just as

the vested interests in the Soviet Union did not allow any reduction of expenditure on conventional arms after acquiring nuclear weapons, so the vested interests in India and Pakistan would hamper such a reduction. Therefore, once Pakistan acquires nuclear weapons, there is no reason to believe that there will be a drastic cut in conventional defence expenditure enabling the country to spare resources for its development.

Third, as brought out earlier, the Soviet Union could not sustain the race because of its low level of development, and economic inefficiency, which forced it to spend 12% of its GNP compared to the US which sustained the race, with its more developed economy, by spending only about 7% of its GNP. If Pakistan joins the race, it will be in a situation with respect to India similar to what the Soviet Union was with respect to the US.

Although both India and Pakistan are in the category of under developed countries, there is a qualitative difference between the two. While the Pakistani economy has shown a better overall rate of growth than the Indian economy, it suffers from the disadvantage of a lower level of industrial development, lower rate of savings and investment, higher per capita indebtedness, higher dependence on foreign aid and lower level of self-sufficiency in defence needs. Besides, Pakistan with a smaller GNP than India spends about 7% of its GNP on defence, compared to India which, with much larger GNP, spends only about 3% of it on defence. These comparative advantages would enable India to sustain a nuclear arms race longer than Pakistan, though it will still pay a high price for it.

Fourth, joining the nuclear race with India is going to bring greater penalties to Pakistan than to India. Already the US has suspended aid to Pakistan in the apprehension or belief that Pakistan has developed a nuclear device. Pakistan's efforts to persuade the US to bring India also under the Pressler Amendment have not succeeded. With the West, led by the US, turning hostile toward Pakistan, most sources for foreign aid to Pakistan would dry up as soon as Pakistan takes the final plunge. On the other hand, the penalty for escalating the arms race to India would not be as severe and debilitating. It can sustain the race without any external assistance longer than Pakistan.

Furthermore, in a unipolar world led by the US, few countries under its influence will provide Pakistan assistance to maintain the race. With its interest in securing aid and the status of most favored nation from the US, Pakistan's long time ally China has given conflicting and confusing signals about its support for development of nuclear weapons by Pakistan. With the emerging détente between China and India there will be additional reasons for China not to encourage Pakistan to join or continue the arms race with India.

Fifth, the Pakistani rulers, before taking the nuclear plunge, must remember that the ethnically diverse Soviet people refused to bear the heavy defence burden due to lack of social cohesion. For a long time ethnic polarisation was contained and suppressed through indoctrination and repression. Though ethnic and cultural polarisation in Pakistan, compared to that in the Soviet Union, is probably low, Pakistan is not a model of social and national cohesion. This is evident from the high level of ethnic polarisation, religious dissension, breakdown of law and order, and political instability the country is experiencing now.

The increased defence burden is likely to reduce the size of the national economic cake and so intensify ethnic conflict over achieving one's rightful share. This would heighten ethnic polarisation. While ethnic polarisation in India is not much better than in Pakistan, it may probably be worse, yet due to other factors Indian society may keep itself together longer than its Pakistani counterpart, once the defence expenditure starts escalating following the onset of a nuclear arms race.

Finally, since independence India has been able to develop a stable democratic system which has so far survived various stresses and strains. Pakistan, on the other hand, has continuously suffered from political instability and rule by the military. Pakistani rulers show greater hostility toward their political opponents than the enemies across the border - an attitude on which democracy and national solidarity cannot be built. Moreover, in the absence of adequate civilian control over the armed forces and over defence expenditure, Pakistani people and their representatives will not be in a position to take any meaningful steps if the nuclear race starts crippling the economy and society. In this respect, Pakistan's situation will be similar to the Soviet Union, with unfortunately similar consequences if it decides to enter a nuclear arms race.

What the above analysis suggests is that if India and Pakistan start the nuclear arms race, the circumstances are more likely to force Pakistan to drop out of the race earlier than India. Like the Soviet Union, the consequences of joining and then dropping out of this race will be quite disastrous for Pakistan. Therefore, the question on which the Pakistani nation, particularly its intelligentsia, needs to ponder over is: should it join a race which it is unlikely to win? Why not search for means other than nuclear weapons to ensure our security and defend our sovereignty?

Given these problems and the state of our society the best strategy for improving our defence capability is not the acquisition of nuclear weapons but to concentrate all our energies on national development. The possession of nuclear weapon will only retard, as argued above, and not promote national development. It can be only a deceptive substitute for it.

There is also moral dimension to our nuclear policy. We are possessed by an urge to point out the chicanery and hypocrisy of our presumed enemies and former allies. However, we

fail to see the gap in our own declarations and actions about our "peaceful" nuclear programme. For a long time, while we wanted the world to believe that our nuclear programme was for peaceful purpose we were vigorously and surreptitiously working towards the acquisition of a nuclear weapon capability. A truly effective way of highlighting the hypocrisy of our presumed enemies and avoid the risk and costs of nuclear weapon would be to sign the NPT and let the International Atomic Energy Agency monitors confirm that our words and actions are consistent.

A Regional Nuclear Issue with a Regional Solution

Syed Talat Hussain

Introduction

India has presented to Pakistan a proposal for an agreement that neither country would be first to use nuclear weapons. Pakistan rejected this no-first-strike proposal on the grounds that it was not a nuclear state, and hence could not enter into such an agreement. A foreign office spokesman later explained that this was a crude attempt on Delhi's part to get Islamabad to admit that it had become a nuclear power. There is however a lobby in Pakistan pleading that Pakistan should make a nuclear device and present the world with a fait accompli.

What would happen if Pakistan declares itself a nuclear state? Would it make it securer than it already is? It should if the bomb lobby is to be believed, but it would not. Here we are not concerning ourselves with the storm of protest and condemnation that Pakistan's nuclear declaration would unleash globally. Or the most stringent sanctions, punitive measures, embargoes on all kind of aid, and immediate, termination of all transaction between Pakistan and the multilateral and donors that would follow. Or the crippling blow that these sanctions will deal to Pakistan's debt-ridden, elite-eaten economy. Or that Pakistan will become a pariah of the international community.

Delhi can react to this development in two ways. It will use the occasion to ostracise Islamabad in the world. It would present its official non-nuclear status to the world as a certificate of good behaviour and win international sympathy and support. That would be forthcoming because then Islamabad and not Delhi would be the target of world censure. Further, Pakistan would be beaten black and blue in the diplomatic battle with India on all important issues. We will pick only one of these: Kashmir.

Pakistan's whole Kashmir policy rests on UN resolutions and its projection of India's untenable position on Kashmir. It is after years of painstaking and intense diplomatic efforts that Islamabad has been able to attract world attention towards the sorry plight of the Kashmiris. Both political protagonists, Benazir Bhutto and Nawaz Sharif, during their stints in power predicated their Kashmir policy on highlighting the issue in international fora. The same in true even today.

With its nuclear declaration, Islamabad will immediately lose this hard-earned support of the international community. Since pariah states, particularly those pitted against the world, are never given a hearing at any international forum, we can rest assured that even if our diplomats go blue in the face shouting that we have a case on Kashmir, they will not find any listeners, helper or friends. Pakistan will have nowhere to turn to, not even to China, which is a signatory to the NPT and committed to nuclear non-proliferation. For all diplomatic purposes, Pakistan would lose Kashmir, and this only for four words: "we have the bomb."

The other shape India's response could take is to use the opportunity to declare itself a nuclear state. One can almost draft the statement that the Indian foreign office will issue: "In view of the grave security threat Pakistan's admission of possessing a nuclear device has posed to India's physical, territorial and geographical integrity, an considering the malicious intent with which this move has been undertaken, we are left with no choice but to turn our peaceful nuclear programme into a weapon-oriented one." In one stroke, Islamabad will give India the opportunity it has been looking for, after China's signing of the Non-Proliferation Treaty, to justify Its nuclear-force build-up on the basis of an external security threat. This would also make India's nuclear programme legitimate in the eyes of the world, which would obviously hold Pakistan responsible for precipitating a situation necessitating such a "desperate move" on Delhi's part.

But that is not all. Unrestrained by any moral or political considerations, and with an airtight pretext of a grave nuclear threat on the border, Delhi will then play the game it is sure to win: the game of nuclear arms race in the sub-continent.

But before we proceed to examine the cost of nuclear arms race for Pakistan, let us first look at the hinge of the bomb lobby's desperate case that an overt bomb will solve Pakistan's security problem. The gist of their contention is that once out of the closet, the rudimentary nature of Pakistan's and India' nuclear programme though denying them first strike capability, will give them a primitive form of second strike capacity. As both will target each other's cities, it is said deterrence will work.

The Bomb-Lobby's Assumptions

There are three assumptions in this line of reasoning, all distorted theoretical possibilities irrelevant to geo-strategic facts.

The first is that the level of development of India's and Pakistan's nuclear programme is roughly equal. Hence the conclusion that their rudimentary nature will level off their first strike capability. This is factually incorrect. India's nuclear programme is in a much more advanced phase than Pakistan's. Delhi began its quest for nuclear power decades before Islamabad did, in the sixties when it was badly beaten in its border war with China. (some Indian scholars trace the history of India's nuclear ambitions from the early fifties). Further, though put together through the usual devious methods that a third world country has to apply to get the elements of nuclear power, Delhi's nuclear programme has been considerably indigenised. Over the years Delhi has successfully built a large scientific and technological base, evident from its ambitious Integrated Guided Missile Programme that began in 1962. Its serious research work on surface to surface missiles began as far back as 1958. Since then, apart from acquiring the capability to produce short and intermediate range ballistic missiles capable of carrying nuclear warheads, research is under way to produce Cruise missiles.

All modern research on nuclear strategy suggests that ballistic missiles are the most effective tools of a reliable delivery system. They are the "real killers." Amongst these missiles, Prithvi has a range between 150 to 250 kilometres with 1000 to 500 kg warheads of various varieties. Agni's range is 2500 kilometres with a nuclear payload of 1000 kg, though its range can be reduced by increasing the payload. With these missiles in store, India has the capability of hitting all targets, repeat all targets, including all major military installations, in Pakistan with a precision that Islamabad's Hatf 1 and 2 are incapable of.

Moreover, India has 17 fighting squadrons as compared to Pakistan's 9 , and has a wider variety of planes, such as Jaguar, MIG-29 and Mirage 2000, capable of delivering nuclear bombs. Also, it has a formidable navy and nuclear submarines which can be used for launching intermediate range ballistic missiles.

So even if (and this if is bigger than the size of Pakistan's domestic and foreign borrowing put together) the level of development of their nuclear programmes is roughly equal, India's more competent delivery system gives it a dangerous advantage against Pakistan. The nuclear capability equation between Pakistan and India is not symmetrical. This knocks the bottom out of the contention that by dispersing, hiding and concealing their bombs and delivery systems, both sides will deny each other first strike capacity. India's better delivery system will enable its nuclear warheads or bomb carriers deep penetration into Pakistani territory, and to hit strategic targets with deadly precision.

Apart from its relatively weaker delivery system, both in terms of quality and quality, Pakistan's first nuclear strike capacity will also be weakened by the fact that India is a geographic sprawl, bounded by the Arabian Sea on the West, the Indian ocean on the South and the Bay of Bengal on the east. It can harden, hide, disperse and mobilise its nuclear weapons in an area of 1, 2609, 346 square miles, one half of the United States. Some of its key nuclear installations as well as cities, Bangalore, Madras, Bombay and Calcutta, are well outside the reach of missiles and bombers.

Pakistan on the other hand is geographically compact and can only move and disperse its nuclear weapons and delivery systems in a stretch of 307, 374 square miles. All of its cities are sitting ducks for efficient missiles and bombers.

Asymmetrical nuclear power balance, different capacities of delivery systems, and immutable imperatives of geography also falsify the assumption that deterrence will work because both sides will have roughly equally second strike capacity to attack each other's cities. This fails to appreciate that India's better delivery systems and advanced nuclear weapons programme will paralyse Pakistan's ability to hold Indian cities hostage in the way India can Pakistan's. India could achieve a decisive advantage by striking first on Pakistan's military and weapons targets.

The third assumption is not only flawed but is also dangerous. It is based on a brutally simple reading of the Indian mind-set, as rational, cool and calculating. Hence the thesis that India's reading of Pakistan's nuclear power will be so as to deter it from launching a pre-emptive strike. Perhaps those who argue from this basis have a special insight into India's strategic thought that we do not have. Perhaps they are using analytical tools to assess India's strategic objectives that are not available to ordinary researchers. Perhaps they believe that despite what India is doing in Kashmir, it can be trusted to be incapable of taking an irrational decision (such as launching a first strike) to seize a decisive advantage. Perhaps so many other factors. But security, as we know from history, depends on assuming a worst plausible scenario. In a desperate bid to shore up an untenable argument through copy-book principles of strategy, this argument overlooks that even if we consider nuclear war unfeasible and suicidal for both, there is nothing to stop our chief adversary from viewing it as feasible and winnable for himself.

It was in the 1965 war that our strategic planners predicated their Operation Gibraltar on the assumption that they would be able to localise the conflict. India proved their calculation wrong by undertaking a much bigger risk and moved its forces across the international border from the northwest and pushed them right up to Lahore. All the tales in

the textbooks about the deeds of heroism that were performed while defending the motherland cannot hide the egregious blunder our planners committed by taking for granted that India would react the way they thought it would. Now a generation later, and in the presence of nuclear weapons, the bomb lobby wants Pakistan's security and strategic planning to centre on the assumption (perhaps hope is the word) that India will not undertake a desperate, irrational, or an unpredictable move. Obviously, they are not the ones who learns from history.

In all probability, therefore, after having declared itself a nuclear state and after having discovered that India using this as a pretext, is increasing its nuclear-force capability, Pakistan will have to run hard to remain in the nuclear arms race, but on a track that has no finish line. India's growing nuclear power will give Islamabad only two choices: produce more nuclear weapons or perish under its superior first strike or counter force capacity. But producing more will require more spending on defence, and on efforts to pilfer fissionable nuclear material. It will also require more spending on improving the delivery system and launching discipline, which means more fighter aircraft, launching pads, and all the infrastructure essential for matching India's nuclear power.

And what will be the cost of this race for Pakistan? Only a fraction could be estimated in rupees or dollars, though even that will be too staggering to bear considering our current economic situation. The real estimate of the cost of a nuclear arms race has to be seen in terms of the impact of increased defence spending on the country's economy, the progress and development of its society, of its people, and the future of its children. The following statistics show how false are prophets who preach that the nation's salvation lies in worshipping a naked bomb, and how blind to reality are those who believe in this fake religion.

Pakistan, one of the poorest countries in the world, ranks 120th among 160 nations of he world in terms of human development. Thirty six million Pakistanis live below the poverty line. Of every 1,000 children, 150 after having lived in squalor die before their fifth birthday. Nearly a million under the age of five die each year from malnutrition or disease, while the growth of nine and a half million is stunted because of malnutrition. Fifty-five million Pakistanis have no access to basic health facilities or clean drinking water, a million have no access to sanitation. Forty three million are illiterate, eighty percent of women cannot read and write. There are fifty percent more soldiers in the country than teachers. On the physical quality of health index, Pakistan ranks 144th, below even Haiti and Bangladesh.

And this is the situation when Pakistan is not a nuclear state, and does not have to support a burgeoning nuclear arsenal. Imagine what it will be like when it is locked in a nuclear arms race. The country's economy will be bled dry, creating the USSR Syndrome, when its arsenals were brimming over with bombs, but its shops had no bread to feed its people (see *The Nuclear Arms Race and the Fall of the Soviet Union : Some Lessons for Pakistan* in this volume). These scenarios are not flights of fancy or unrealistic extrapolations. These are the facts of life that have to be borne in mind while preparing the country's defence calculus.

One can only marvel how the mad hatters from strategic wonderland conveniently overlook the screaming fact that more states have died and disappeared from the global map because of bad economic health or social upheavals caused by these than those which have been able to survive on the strength of their nuclear bombs.

The next step ?

Any effort to address this must begin with the international environment. The US Deputy Secretary of State, Strobe Talbott's South Asia visit (in April 1994) was a high-point in the Clinton administration's global effort to freeze, reduce and eliminate weapons of mass destruction and their means of delivery. For the region, the strategy to achieve this goal was two-pronged: creation of a multilateral forum for discussion on the nuclear issue comprising all five declared nuclear states in addition to Japan, Germany, India and Pakistan; to conduct bilateral negotiations with India and Pakistan on verifiable freeze of a production of weapon-grade material-enriched uranium and plutonium.

This step-by-step approach is more flexible and comprehensive as compared to the rigid, single-track policy of the Bush administration driven as it was by an obsession to roll back Pakistan's nuclear programme, One sign of this flexibility is the Clinton administration's willingness to live, even if temporarily, with the region's acquired nuclear capability (ANC) provided it is capped at the current level. In this regard it has offered Pakistan a one-time unlocking of the Pressler Amendment to facilitate the delivery of 38 mothballed F-16s, for which Islamabad has already paid $658 million, in return for a freeze on the production of nuclear weapon-grade material. The same offer to India promises a juicy deal on the Tarapur reactors' fuel supply, and other incentives in trade, aid, and transfer of computer and space technology. In sum, US nuclear diplomacy for South Asia is changing its profile: it is moving from coercion to co-operation, from pressure to persuasion.

But how much will this serve the cause of non-proliferation? Not much. This new approach leaves out of its view the geo-strategic context of the region's nuclear problem. The possession of weapons of mass destruction has always been regarded as a means of mass protection. Their spread across the globe throughout the cold war and after has been impelled by this belief. The situation is not any different in Pakistan's case. It regards it's nuclear deterrent as a ready-to -hand equaliser to India's growing military muscle.

But the new US approach does not take this fact into account, though not surprisingly, as it is structured according to its global non-proliferation agenda. This agenda, in turn, is shaped by the discovery, made after the disintegration of the Soviet Union, of the immorality and futility of nuclear weapons as guarantors of national security, The offer of 38 F-16s has been made on the assumption that after the cold war the world has become a safer place to live in, and nations can now do without doomsday weapons. But not all countries can share this view. Pakistan would have, had India, like the Soviet Union for the US, disappeared from its geo-political scene as a security threat. But India is there, in one piece, and with a nuclear programme that is kicking, as is the threat that it poses to Pakistan's security. Hence Pakistan's nuclear deterrent.

Far more reasonable would be to see the region's proliferation problem in the framework of what an analyst calls the "Ocean food chain model": big fish eat little fist that have just eaten the littlest fish. Superpower rivalry forced China to go nuclear which gave India an excuse to follow suit compelling Pakistan to acquire a nuclear deterrent.

Now that nuclear history is being reversed, it is only fair that its chain is not broken. This means that since Russia and America are engaged in a concerted effort to de-construct their nuclear weapons and have pared down their nuclear stockpiles, and China has been persuaded to join the NPT, India should be the next to deweaponise its nuclear programme. This would give Pakistan the necessary incentive to rethink its nuclear option. Unfortunately, there is no indication that the Clinton administration has kept this sequence of nuclear history in mind. If it had, it would not have insisted that Islamabad's response to the proposal to cap its production of weapon-grade material should not be contingent upon or influenced by India's stand on a similar offer.

There is another flaw in this approach. It neglects the fact that in Pakistan the nuclear option is not an issue of geo-politics alone, but of domestic politics as well, and an emotive one at that. Various powerful blocs and political actors-the government, the president, the army, the opposition, the press and the public opinion and their views, in varying degrees-form part of this issue. By and large, there is an across-the-board consensus on the retention of the nuclear option, at least as along as India retains its.

The Clinton administration has not paid much attention to this aspect and has crudely cast its offer of a one-time waiver of the Pressler Amendment as a bargaining chip in a cheap deal. This is unlikely to win its proposal many supporters here, both in public and in the Establishment, essentially because it is widely perceived to involve "conceding" part of the country's nuclear programme.

Regional Measures

What then is the way out? To de-nuclearise South Asia and to promote the cause of non-proliferation it is important to evolve a regional mechanism. This can be partly patterned after the experience of Argentina and Brazil in South America who achieved nuclear détente through a chain of bilateral security and confidence-building measures. The change which has taken place there is breathtaking. After twenty years of mutual suspicion and covert nuclear weapons programmes, Argentina and Brazil not only have a Joint Committee on Nuclear Policy where the respective atomic energy commissions discuss safety issues, but a wide-ranging bilateral set of agreements that include no nuclear test explosions, and checks on each others nuclear facilities which amount to a local NPT. Their respective Presidents have even visited each others once secret nuclear weapons facilities.

It is hard to define the contours of any such arrangement for South Asia in sharp form. But mutual understanding and agreement between Pakistan and India on any of the following can help concretise the idea:-

A regional nuclear test ban treaty;

Simultaneous freezing of fissile material production;

Agreement against targeting each other's cities;

Simultaneous announcements of non-first strike, an;

Non-deployment and employment of ballistic missiles.

These measures have to be integrated with the larger effort to remove sources of volatility in the region. So long as South Asia is unstable, whether because of Kashmir or Siachen, weapons of mass destruction cannot but be part of its geo-strategic landscape.

The Nuclear Non-Proliferation Treaty and Pakistan

Khalid Ahmed

Introduction

The Nuclear Non-Proliferation Treaty (NPT) is coming up for extension in April this year. It has completed its stipulated 25 years in force and has either to be set aside or renewed by the signatory states. The signatory states will also decide the length of the next period of its extension. The United States and its allies want the treaty to be extended indefinitely because only one extension is catered for in the text of NPT. There are168 signatory states, making it the most powerful legal norm against proliferation; staying outside of this global membership is itself a pressure with which a non-signatory has to cope with. Extension of NPT will require a 'yes' vote by a simple majority of 85 votes. One survey carried out two years ago indicated that 80 signatory states favoured an indefinite extension.

The Treaty has not performed well in the past because its members have violated it with impunity; although a majority of the members of the United Nations are signatories, and those who have refused to sign stick out, there will be persuasive criticism of the way the treaty has been promoted so far. The NPT has the provision of a review conference of signatory states every five years. In the last review conference in 1990, the non-nuclear signatories raised so many objections to the way the treaty was being enforced that it couldn't issue an agreed final declaration.

The April conference will be carefully managed by the nuclear powers who want nuclear weapons banned outside of their own exclusive club; it will be watched by those signatories who don't possess the bomb so that they can leverage the weapon-states to give up further development of nuclear weapons by a ban on further nuclear weapons testing.

At the first meeting of the preparatory committee of the NPT in 1993, Mexico led a group a countries in making their 'yes' to an indefinite extension conditional to the nuclear power signing a Comprehensive Test Ban Treaty (CTBT) and offering 'negative' guarantees to the non-nuclear states against nuclear aggression. That would mean that a CTBT had to be entered into by the nuclear club (including China) before April 17, 1995, when the treaty comes up for extension. That this will not happen is obvious because China has shown no signs of accepting a ban on testing nuclear devices. The truth of the matter is that the nuclear powers are not in full agreement over how to develop a persuasive anti-proliferation stance on the basis of the NPT.

The modus operandi of persuasion (or dissuasion) so far has been bilateral US pressure built up on 'offending states', which looks like interference. States that have succumbed have usually been punished economically till they could no longer take the punishment. The denuclearisation of Brazil and Argentina came about after the two states could no longer bear the burden of militarisation and experienced total collapse of the economy together with the military elites that promoted militarisation. South Africa succumbed after its state-dominated economy fell apart and its white elite began to lose hold over the state as well as its hegemonic role in Africa. NPT member state North Korea seems to have succumbed because of impending economic collapse, international isolation and, above all, pressure from Washington. For countries who recommend defiance, North Korea has finally not emerged as a good model. The weakest point in this persuasion is the threshold state of Israel on which the US is not able or is unwilling to exert the same kind of pressure as it does on India and Pakistan.

In South Asia, where Pakistan is located, India is the major threshold state with Pakistan linked to it as a 'responding' threshold state. All the other states of South Asia are members of the NPT. In response to the pressure brought to bear on India for joining the large NPT club, New Delhi links its nuclear programme to China; in other words, it will put its reactors under safeguards if China gives up its nuclear arsenal. To which China, which qualifies as a nuclear power under the clauses of the NPT, says its programme is linked to other nuclear powers. The pressure on Pakistan has been mounting over the years. But Pakistan doesn't say it opposes non-proliferation. Its stance has been firmly in favour of the NPT, but it recommends a regional approach, meaning thereby that it would sign if India did the same.

Nuclear Nationalism

Pakistan smarts under the realisation that it is not being treated by the US at par with India. There is a country-specific US law that bans aid and export of military-related technology to Pakistan. The Pressler Amendment, which also persuades the 'nuclear club' to treat Pakistan as a pariah state, was passed with Pakistan's acquiescence during the Afghan war to make it easy for the US president to bypass the Symington Amendment and allow aid to Pakistan. After the Afghan war this law has started biting and is considered unjust for being specific to Pakistan. Not only has it aroused public ire in Pakistan against the erst-while ally the United States, it has also looked bad to some inside the US State Department and the US military.

Pakistan's nationalism has become linked to its nuclear programme. As a state demanding change of the status quo in South Asia, Pakistan fears retaliation from a militarily superior India and is somehow convinced that as long as India perceives it as a 'threshold' state it won't attack. Pakistan's military doctrine of defence is based on the 'bomb'. Most political and

professional personalities who recommend a hawkish India policy (in some case all-out war) in Islamabad rely on the 'option' to develop a weapon. There is a strong lobby among retired generals and religious leaders in Pakistan to 'test' a nuclear device to remove international pressure and ensure that no elected government is able to bend under economic crisis and accept safeguards, thus destroying the programme. Elected governments have come under pressure since 1989 when, it is said, Islamabad agreed to 'cap' its programme. The hawks in Pakistan will be further riled by the fact that in 1996 a conference on a Comprehensive Test Ban Treaty (CTBT) will be held which will seek to altogether ban 'testing' for all members, inclusive of the nuclear powers.

Pakistan has a 'consensus' on the 'bomb' (as on Kashmir); therefore it will be difficult for Pakistan to become flexible on the stance it has so far taken. Washington has applied pressure in favour of a 'unilateral' declaration in favour of the NPT by Pakistan. The argument is that by doing so Pakistan would be able to bring pressure on India to resile from its own stance. There is no evidence that India will ever bend to US pressure because its ambitions are regional (hegemonic) and international (big power inside the Security Council). Yet the American perception of the Pakistani bomb remains delinked from the region. A recent news about a Radio Tehran comment that Pakistan's prime minister Ms. Bhutto intends to make a unilateral accession to NPT has aroused concern in Pakistan and has compelled Islamabad to issue a denial.

The Pakistani 'bomb' is supposed to arouse more concern in Washington because it is 'Islamic' and because Islamabad is subject to upheavals and adventurism. It is now known that at one point Islamabad was approached by the then Chief of Army Staff General Mirza Aslam Beg with the proposal that 'nuclear technology' be transferred to Iran in consideration of aid to Pakistan's military budget, affected since 1990 by Washington's aid switch-off. There is also evidence that the COAS helped in the overthrow of one elected government and seriously destabilised another elected government unwilling to toe his line of 'defiance' during the Gulf War. Subsequently, the same military leader was exposed as being involved in a bank scam, about which the government was able to do nothing. In short, Pakistan is subject to a kind of 'adventurism' that appeals to a disenchanted public and renders its nuclear programme 'unsafe' compared to India's whose civilian leadership is perceived to be in control.

The bitter controversy in Pakistan over the various aspects of its nuclear programme has gone on relentlessly. Politicians have pilloried one another over 'freezing' and 'capping' politics. Pakistan has followed a consistently pro-American policy in the past, basically to fend off a powerful India in the region. Looked at objectively, this policy has successfully isolated a pro-Soviet India over many decades, reaching its climax during the Afghan war when India perceived Pakistan getting an edge over it even in conventional arms. But being pro-America means being tied to concessional relationships with international institutions dominated by the US and its

allies. During the heyday of the Pak-US friendship. Pakistan developed the critical part of its nuclear programme and accepted a 'facilitating' law in the shape of the country-specific Pressler Amendment to escape the mischief of the Symington Amendment enforced by a hostile US Congress. In the process, it got used to 600 million dollars of annual US assistance.

It is easy to see why Islamabad agreed to 'freezing' its nuclear programme in 1989. Any prime minister whose revenue budget is less than the total amount payable for defence and debt-servicing, would like to retain the option of borrowing dollars to pay for development and state-sector salaries. Former prime ministers may quarrel about accepting the 'freeze' or signing on the dotted line for IMF conditionalities, but the truth of the matter is that Pakistan's economy is not 'self-reliant' enough to withstand external pressure in the same measure as India's.

Prime minister Mian Nawaz Sharif accepted the ground realities created by our nuclear programme when he announced 'self-reliance' as the cornerstone of his government in 1990. When he was unfairly removed from power in 1993, the economy had not reached the coveted goal. The care-taker government of Moeen Qureshi (who was accused of being an American 'plant') had to roll back 'self-reliance' based on a record fiscal deficit reaching nearly 9 percent, and accept even more stringent IMF conditionalities to shore up the foreign exchange reserves of the country. Today, Pakistan finds itself in a situation of 'reliance' more than ever before. Because of its bad law-and-order profile and political instability, its 'open market' economy is under threat in the same manner as that the Mexico. In January 1995, the flight of foreign investors from the Karachi Stock Exchange accounted for a loss of over 20 billion rupees in a matter of hours.

It is being said that the US has accepted South Asia as a 'capped' nuclear-capable region. This could mean the end of Washington's crudely discriminatory anti-proliferation policy in the region. If Pakistan and India are to continue their rivalry, then Pakistan needs the nuclear option more than India does because of its lesser conventional capability. Pakistani critics are now fearful that if the UN disarmament committee is able to push through a treaty on limiting the accumulation of fissionable material this year or the next, then Pakistan will have less nuclear weapons-usable material than India because the programme here was capped in 1989. This would notionally mean only ten bombs in Pakistan as against India's hundred, and India will go on producing nuclear weapons-usable material till the cut-off date is announced in the new treaty.

Ultimately, Pakistan's crisis is not defence against a hostile India, but the viability of its defence-oriented economy. Its policy options are non-existent because each government is presented with an irreducible agenda of unchanged positions. Because of the trouble in Kashmir, it has even less flexibility in its foreign policy than it had during the days of General Zia. As long as it remains engulfed in a warlike environment internally, it will find it difficult to make its

economy self-reliant enough to withstand external pressure. The nuclear powers will probably succeed in putting together the required number of votes in April to extend the NPT indefinitely, which will mean that the pressure in favour of signing the NPT as a way out of economic collapse will remain.

Opinion-writers in Pakistan must spend more ink on how Pakistan can withstand this pressure in case the economy breaks down and there is general unrest in the country. At the present juncture, the national economy is facing a downturn never seen before. Its agriculture has declined, forcing it to import food and cotton, the latter accounting for more than half of its export earnings. Political instability is at its highest and there is no possibility of Pakistan settling down to a peaceful internal governance. It is very difficult to predict that the country's economy will start functioning normally any time during the current century while there is fear that the government may be subjected to some kind of 'revolution' leading to international isolation and war with India.

Incentives

As April 17 draws near, there is intense politicking going on about the period of the next and final extension. The view in the West (the US, Britain, France, Russia) is that unless the treaty is extended for an indefinite period of time, it will not persuade the non-signatories to sign and may even persuade some signatories to carry on nuclearising covertly. If states with nuclear ambitions know that the treaty is going to lapse forever after a given period of time, they may keep their programmes 'this side of turning the final screw' till then, and then take the nuclear option by making the bomb overt. On the other hand, non-nuclear signatories can only exercise pressure on the nuclear powers if the extension is limited. Since the treaty allows only one extension (unless the treaty is amended), this leverage against them is time-barred.

Perceptions about the NPT are varied. The West looks at the treaty as the most powerful consensual legal norm against nuclear proliferation with almost the entire UN member community behind it. The rate at which the non-signatories and 'rebelling' signatories' have 'succumbed' to it in the past decade is quite impressive in Western eyes. Brazil and Argentina gave up their 'option' and signed after their economies collapsed under high inflation and were bailed out by the IMF, which put the two under intense pressure from the Western powers. South Africa stripped itself of its bombs and signed the NPT after its predominantly state-sector economy collapsed and its white rulers foresaw the country coming under black majority rule. Ukraine 'gave up' its nuclear arsenal to save its economy, settling for approximately 800 million dollars of aid from Washington and some kind of 'verbal' guarantee against the Russian nuclear threat. Kazakhstan agreed to putting its nuclear weapons under some kind of central control from

Moscow, and NPT member Iraq was 'stripped' by the UN Security Council after its defeat in the Gulf war.

Another NPT 'rebel' North Korea first stood firm against pressure from the US to open all its nuclear facilities to inspection, then decided to 'discuss' the matter with Washington under pressure from its rapidly declining socialist economy. NPT member Egypt has been taking a position against the favourable treatment meted out to a non-signing Israel by West. On the eve of the April NPT conference, it announced that it would not support the US campaign to convert the NPT into a permanent treaty. Egypt's stance can be compared to the position taken by Mexico last year: the enforcement of the treaty is not equitable and its extension should be made conditional.

However, Egypt's is amenable to American pressure because of the annual grant of two billion dollars it receives from Washington to bolster its crumbling economy. An Egyptian Minster betrayed signs of 'relenting' when he said that Egypt might change its mind and accept an indefinite extension 'if Israel promises to sign the NPT in some future time'. Mexico, already under pressure from its NAFTA big brother, has collapsed economically and is currently being bailed out with 40 billion dollars from the West with very visible 'strings' attached to it. It is unlikely that Mexico may continue to lead the bloc that made the extension conditional to a test-ban regime.

The United States and the 'nuclear club' it leads have not been able to develop an 'incentives' approach in their campaign to denuclearise South Asia. So far the advocacy in favour of NPT has been characterised by 'disincentives', in other words, how Pakistan will be 'punished' if it doesn't sign. Pakistan may be moving towards the 'basket case' economic condition required for final prostration, but it would be wrong to equate it with Argentina, Brazil and Ukraine. The last-mentioned country gave up its nuclear storehouse in return for the money that it needed critically and, more importantly, in return for a bilateral security guarantee. There is a need for positive 'incentives' to persuade Pakistan to sign on the dotted line while India keeps its nuclear arsenal.

Former Pakistan foreign minister Mr. Agha Shahi has been the most persuasive advocate of 'negative' nuclear guarantees to Pakistan as a quid pro quo for signing the NPT. When he first raised that issue at the UN there was no response because the nuclear states didn't want to commit themselves as 'guarantor'. In fact, there was a period of time when Pakistan's stance was predicated on a demand for nuclear guarantees against India if the latter chose to mount aggression against Pakistan.

There was a Security Council resolution, number 255, in 1968 which allowed the nuclear club to come to the defence of any non-nuclear-weapon member of the NPT threatened with

nuclear attack. The resolution is non-binding and subject to veto by any of the five permanent members of the UN Security Council. Mr. Agha Shahi was in favour of 'negative' guarantees which proscribed use of nuclear weapons against non-nuclear states, but the big powers were in no mood to give satisfaction on this score. Thus the 'positive' guarantees offered in the resolution have never figured as a counter in non-proliferation politics. Mr. Agha Shah's argument is that guarantees to the non-nuclear states will bite only if they are 'negative' and if they are embodied in a separate treaty promising credible assurance against nuclear aggression.

Today, all the old arguments have changed. Pakistan gives 'moral' support to Kashmir and is presumably safe from Indian conventional aggression because it is perceived to be in possession of a nuclear bomb. It cannot be satisfied by a guarantee against nuclear aggression in return for a programme that deters conventional aggression. Economic punishment that Pakistan is taking is mounting as time passes. The country is politically unstable and riven with disagreement. As its economy falters and political quarrels develop into aggressive confrontation, its ability to defy international pressure declines.

By all signs and tokens, Pakistan will find it impossible to become economically self-reliant to the extent that it could say 'no' to NPT; at the same time, its ability to 'negotiate' itself out of a situation of economic collapse and subsequent strife has been seriously undermined by a lack of national consensus on how the crisis should be handled. Keeping the bomb could mean deterioration into the sort of chaos that is spreading in Pakistan's northwestern neighbourhood; more dangerously, it could mean descent into extreme poverty and terrorism followed by an overthrow of the society as it exists today.

Seizing The Nuclear Moment

I. Hassan

Introduction

After the end of the Cold war, with the collapse of the Soviet Union, the United States is now the possessor of most nuclear devices. It has appointed itself the arbiter as to who should have nuclear devices and who not. Trying to limit the ownership of nuclear bombs to a select club, while denying it to all else, will not work. In fact, like a leaky bucket, it is already getting out of hand, particularly after the break up of the Soviet Union. Some of the emergent states such as Kazakhstan, Ukraine and Belarus have become owners of a limitless number of thermonuclear bombs. It is now feasible to buy ready-made bombs as one can buy artillery pieces. Further, the technology regarding the making of nuclear devices is now over 50 years old. It is no longer esoteric and top secret. It is readily available to a physics student, and a bomb can be made by almost anybody.

Pakistan has been struggling to cope with the international changes that have taken place. No longer the most-allied ally it has failed to comprehend the new US interests in South Asia. It's nuclear weapons programme has brought it particular grief, as the US has pushed for non-proliferation. It's response has been that our's is a peaceful nuclear programme. If it is so then it is easy to prove, and there will be no harm done, Pakistan will gain. If it is not, then we have created only danger for ourselves.

The policy of "studied ambiguity" that Pakistan has adopted, the hint of an invisible deterrent, is not viable. It is dangerous, costs more than most people realise, and is no real deterrent. As such it leaves Pakistan more vulnerable. There are however ways out of the pit we have dug for ourselves.

A World-Wide Ban on the Bomb

The only sure way to get rid of nuclear weapons is for them to be banned for all. There is a precedent for this. During the first world war, poison gas was used for the first time. After the end of the war, the powers that were at that time gathered at Geneva and banned the use of poison gas. The reasons were that the combatants had realised that it was a double-edged weapon. The user could not have complete control over it. After releasing it, if the wind suddenly changed (and this did happen) it was the user who suffered enormously. Besides, till then there was the distinction between combatants and non-combatants. Poison gas did not differentiate between either.

Accepting its nasty effects, the use of poison gas was banned in 1922. In the early days of the ban there was doubt and fear that somebody would break the ban as there is today with regard to nuclear devices. This fear was manifest right up to the start of the second world war when allies on both sides were issued with gas masks and were trained in their use. The civilian population in Europe was also supplied with gas masks. Poison gas, however, was not used throughout the second world war, mainly because it was not a static war as had been the case during the first world war when armies faced each other sitting in dug-out trenches.

Now, poison gas is bad enough. It, however, does not cause absolute destruction. Life survives. With nuclear devices, life can become extinct. Not only human life but all forms of life because while radioactivity can spread all around the world, affecting friend an foe alike, if a large number of nuclear devices is used, they send up smoke and dust into the atmosphere, besides spreading radioactivity, that the sun is blanketed with the result that an everlasting winter can descend on the earth with everything frozen and all plants ceasing to germinate and multiply. No food, no water, no nothing.

What has been stated above is no fancy. It has been established scientifically. This indeed is the real deterrent to any user because we are selfish to the nth degree and if we know that by our own act we ourselves would be killed, that would deter us from using this so-called deterrent. There is yet another and more practical side to this deterrent factor: anyone trying to make nuclear devices enters a race towards bankruptcy. The example of the Soviet Union is before us, In trying to keep up with the Joneses, it disappeared from the face of the earth and bequeathed unmanageable problems to its successor states.

Like poison gas, it has been realised that nuclear bombs are not only weapons of mass destruction but that they are weapons of absolute destruction. It follows logically that like poison gas, nuclear bombs and other such devices should be banned totally. There should be none, repeat none, who should be allowed to possess it.

At present, the countries that are allowed officially to possess nuclear weapons are the United States, Russia, China, Britain and France. There are others whose entry into this club is not accepted, and who are either being brow-beaten or cajoled into giving up the bombs that they possess. The only way a total prohibition for all not to possess nuclear devices is for the United States to take the lead. It should renounce nuclear bombs unilaterally and thereafter instead of trying to enforce an unenforceable Non-Proliferation Treaty, it should try to bring about a total non-possession and non-use treaty.

It is ridiculous that a small group of islands off the Northwest coast of Europe, being an impoverished country consisting of 53 million people, should be a nuclear power. Britain has fallen on such lean times that it is reducing its armed forces furiously. The great British Navy has been reduced to a few submarines as capital ships, and yet it must carry on this charade of being a nuclear power. Nuclear power against whom? There is not an enemy in sight.

The same argument applies to France. It, like Britain, was an empire. Now, although better off than Britain economically, it is a middle-range power, and is like the man who is all dressed up and has nowhere to go. France, too, has no enemy.

Russia's economy is in shambles. If the US gives up the bomb, it would not be difficult to persuade Russia to do likewise. Along with Russia, Ukraine, Kazakhstan and other would be happy to join the non-possession treaty.

China, which is making enormous economic strides, once assured that Russia next door is joining the non-possession, non-making treaty, could be persuaded to do so in order to enable it to make greater economic progress once it is divested of the burden of making nuclear devices.

Nuclear Beggars and Choosers

It never pays to get on a high horse because more often than not one has to get off it with a considerable loss of dignity. Pakistan has taken a long time to realise that after the end of the cold war, and particularly after its resounding victory in the gulf, the self-interest of the US has altered. During the cold war, the US would have much liked to have had India, with its vast manpower and a large army, as its client state. Since India was aligned with the Soviet Union, notwithstanding its protestations of non-alignment, the US was constrained to make do with the second best - Pakistan.

Pakistan besides had a tenuous contiguity with the Soviet Union. The US therefore began to build up Pakistan's armed forces or gave it aid otherwise. This suited the autocratic rulers that Pakistan had and which the US had helped to install. And then there was a windfall for the military dictator, General Ziaul Haq, just when he was beginning to feel shaky. The Soviet Union occupied Afghanistan. This cut the purse strings of the US and largesse began to flow into Pakistan in no small measure, both in the shape of military and other aid and assistance for the Mujahideen. A good portion of what was meant for the Mujahideen never got to them. It helped Pakistan in its profligacy. Pakistan's rulers became pampered children not thinking of the morrow and believing that this abundance would continue to flow.

Then with the end of the cold war, US friendship with India became possible. India having been obliged to distance itself from the Soviet Union from whom it could hope to get nothing in future was happy to play the part of a big regional power in South Asia and act as the policeman in the area for the US in the new world order.

Pakistan's policy makers did not perceive this change and continued to tilt at the wind mills in pursuing the previous US policy in Afghanistan. The US, on the other hand, served notice on Pakistan just when the gulf war build up was beginning to mount up. Pakistan refused to believe or accept that the world had changed and when the US stopped aid to Pakistan in October 1990 behaved petulantly and struck an attitude believing that since US always came to

Pakistan's aid, by saying that we were henceforth going to be self-reliant, we could somehow frighten the US or persuade it to come round yet again.

Years have gone by and a new realisation has dawned that without US aid which Pakistan was ostensibly spurning, it just was not possible to carry on what with a huge unbridgeable budget deficit. By now it has sunk deep that indigent people are not in a position to strike any attitudes.

The stated reason by the US of stopping aid is that the US president is unable to certify that Pakistan is not in possession of a nuclear device. This certification is required by the US law known as the Pressler Amendment. The only way to overcome this is to declare that Pakistan does not have any such weapon. Instead of doing that, Pakistan has continued to maintain it is engaged only in peaceful uses of nuclear energy.

Now, this rhetoric of peaceful uses of nuclear energy has been carried on by each successive government that has come and gone. If it is so peaceful, then there is no harm in disclosing what research is being carried out. Scientific ethics demand that all results of such research be published so that the world scientific community can verify the experiments and their results. The world could thereby benefit from it. This is the norm the world over. Scientific research and discoveries are not like a hakim's prescription, jealously guarded and handed over in utter secrecy from generation to generation. If work for peaceful purposes is being carried out then an inspection of the facility doing so should be welcome. If inspection by another power militates against national sovereignty, then the International Atomic Energy Commission should be invited to do so.

Our people need to eat. Our people must have shelter. They must be educated. Possession of a nuclear weapon impoverishes them and fulfils none of their needs. If it is argued that possessing a nuclear bomb acts as a deterrent, then it is a dangerous and destructive assumption. For a small country such as Pakistan, pitted against India, being unable to deliver a bomb not farther than a few hundred miles can only invite a pre-emptive first strike. With three bombs dropped on Karachi, Lahore, and Islamabad, Pakistan can be shut down completely. A valiant nation like Japan was compelled to sue for peace with just two bombs dropped on Hiroshima and Nagasaki.

A Fatal Ambiguity

The sudden cacophonous noise both by the government, the opposition and their sundry supporters or detractors accusing each other of abandoning the nuclear bomb misses the point altogether. Both sides are using it as a party political volley ball and are intent on scoring points against each other. The question to ponder is whether Pakistan should have a nuclear bomb at all. It is no use going over the semantics of "freeze", "roll back" or "capping".

The first thing to state is that almost everybody here thinks that it is a loud bang like fireworks that children use. They have not grasped what an awesome and horrendous weapon of destruction it is. Not only does it hurt one's enemy but also people right round the world. Like poison gas of the first world war, it is not a selective weapon. Depending upon the direction of the wind, it can hit oneself also.

Unfortunately nobody is willing to consider the effect of bandying about this bomb. The bomb has assumed the status of religious dogma so that anyone opposing the use or possession of it immediately earns the ire of all, as if he had committed a blasphemous act. It is most unfortunate because by branding people traitors and whatever else, they prevent people thinking concretely, rationally and dispassionately.

The phrase-smiths in Pakistan have been over-active. A charming phrase "studied ambiguity" has been minted. It has become official policy to go on uttering this mantra. What is meant by this is that the other side, or those who are advocates of non-proliferation, will keep on guessing. But people are not naive. These who want to find out will have found out whether there is a bomb or not, and if any, how many. Going on bleating about peaceful programmes fools nobody. It is the kind of braggadocio that a Bhati Gate tough adopts when despite the fact that nobody is restraining him goes on shouting "let me go, I'll see him off".

The next mantra that all have adopted is that it is a deterrent. Despite the fact that the policy of mutual deterrence was abandoned, long before the cold war ended, both by the USSR and US, the news that this bomb is a deterrent has reached here rather late. Both the super powers found that despite their stockpile of nuclear bombs, by which they could have destroyed the whole world three times over, they were obliged to build enormous conventional war-machines. This impoverished the Soviet Union and in fact was instrumental in its disappearance.

In Pakistan the lesson has not been learnt that building this weapon so eats up resources that despite eating grass, it gets one nowhere. And after all, the plutocrats who think that it is essential to have it as a deterrent will continue to eat parathas and pulao whilst the common man will be deprived of even grass.

Coming to the theory of deterrence, let us examine it as it is applicable to the rivalry between India and Pakistan. The basic kernel of the theory is that if the attacked party is able to absorb the first pre-emptive strike by nuclear bombs, and is instantaneously able to retaliate with a massive shower of nuclear bombs on the attacker, the attacker knowing this, will not attack because the retribution would be unacceptable. Let us then take the situation between India and Pakistan.

First of all, Pakistan lacks a credible delivery system. But again assuming that Pakistan is able to deliver the bombs by aircraft, and even by perhaps lately acquired missiles, the damage that Pakistan would do to India would be tremendous. But because India has so much length and

breadth, vast areas of India would remain unaffected. This means that India is able to absorb the first strike. Having done so, India would be able to drop just three nuclear bombs on Pakistan with its known and tried long-range missiles from thousands of miles away. These three bombs, one on Karachi, one on Lahore and one on Islamabad would effectively put Pakistan out of business altogether. There would be ability to retaliate at all, Pakistan's vast armed forces notwithstanding, for these armed forces would be in no position to act.

It is impossible not to arrive at this conclusion and yet both the political parties talk of studied ambiguity and mutual deterrence. All that studied ambiguity might achieve is that the other side, incorrectly perceiving that Pakistan is about to launch such an attack, could shower its nukes pre-emptively. In other words, this studied ambiguity can be the cause of inviting total destruction. It follows that unless Pakistan can have vast quantities of nuclear bombs and is able to reach as far as Cape Comrin in the south of India, it is foolish to even think of being a nuclear power, for Pakistan does not have the economic capability to achieve such a state, despite eating grass.

One course for Pakistan could be to renounce nuclear ambitions, and so remove the danger of a pre-emptive strike. Another could be to sign the Nuclear Non-Proliferation Treaty unilaterally, relying on the United States to pressurise India to do likewise. Pakistan could also diplomatically seek US assistance, so that if attacked by nukes the latter will come to Pakistan's aid. This should be, or could be negotiated, bilaterally when offering to sign the NPT. The exercise of any of these options can bring a lot of benefit, such as better relations with the US and what accrues from that and saving of resources that can be used for nation building such as education and health. The prize is great. It needs courage to seize it.

Time for a Third Nuclear Debate

Farhatullah Babar

Introduction

Traditionally there have been two kinds of debate about the nuclear issue in Pakistan. Both kinds have involved irresponsible participants, and led to dangerous positions. They share more than just irresponsibility. Between them they have scared successive governments in the country into believing that any talk with the US or India on the nuclear question will send it packing. The time has come to call the bluff of the bomb-wallahs.

The first kind of nuclear debate involves politicians, retired generals and some scientists, is usually one-sided, and involves public audiences and propaganda gimmicks. It is meant for domestic political consumption. The recent demand by the bomb lobby that Pakistan should openly declare itself as a nuclear weapons state, and the statement by Nawaz Sharif that Pakistan already possesses a bomb are just part of a long line of such demands and disclosures. In fact, the real or imaginary atom bomb has, since its inception, been kicked about like a football. The results of this particular atomic irresponsibility are that the world has negative perceptions about our nuclear programme, and the country suffers accordingly.

The second kind of nuclear debate has been monopolised solely by General Head Quarters (GHQ), the Foreign Office, and a few scientists eager to advertise themselves as the creators of deterrence in South Asia. Their debate too is one sided. Rather than shout at the public they whisper to each other, and create a conspiracy of silence. They fear that an open public debate can bring out some unpalatable truths, expose many a white-washed hero, and raise pertinent questions about national security. Their irresponsibility is in overlooking the fact that truth and wisdom are neither the monopoly of GHQ or the Foreign Office. Truth and wisdom emerge only as a result of discussion among a large number of people, in which each lays claim to a bit of reality.

Nuclear Football

Pakistan's nuclear programme has been under constant threat ever since it was embarked upon in the 1970s, soon after India's nuclear explosion. Remember former US Secretary of State Henry Kissinger's 1976 threat to Prime Minister Bhutto of making a "horrible example" of Pakistan? Despite such threats no great damage was done. The situation changed however in the mid 1980s, when during the days of Zia-ul-Haq the nuclear issue began to be exploited for

domestic political reasons. As a consequence the nation has had to pay an enormous political, diplomatic and economic price.

The late General Zia, just before his fraudulent referendum of December 1984, announced for the first time that Pakistan had achieved the capability to enrich uranium. The result was the enactment the following year of the Pressler Amendment. A Pakistan-specific piece of US legislation requiring the US president to certify Pakistan's nuclear innocence every year for Islamabad to continue to receive American economic and military aid.

A few years later, in the 1988 and 1990 elections, the IJI sought to win public support by exploiting the nuclear issue. IJI leader Nawaz Sharif not only accused the rival PPP of being soft on the bomb but vowed to explode an atom bomb on coming into power. The result was a call by US Senator Glenn to tighten the screws on Pakistan. Along with Senator Pressler, Glenn mounted a campaign of vilification against Pakistan.

Subsequent Pakistani rhetoric forced the US in 1990 to actually apply the Pressler Amendment, and suspend all economic and military assistance to us. Delivery of the F-16 fighter aircraft, for which Pakistan had made payment, was withheld, France refused to supply the promised 900 MW nuclear power reactor, while Japan and other countries began openly talking of linking aid to Pakistan's signing of the Nuclear Non-Proliferation Treaty.

To make matters worse, at a time when the West was alleging that Pakistan will transfer nuclear technology to other countries, some IJI senators were publicly demanding that Pakistan should export atomic know-how to make up for the aid cut-off.

During 1990 and 1991, when the Foreign Office was taking pains to make the world believe we had no nuclear ambitions, the then Chief of Army Staff, General Beg, was going around advocating that Pakistan acquire "nuclear deterrence which is correctly perceived by the enemy as such." The result was that the US refused to receive Senate Chairman Wasim Sajjad until Pakistan gave some assurances demanded by Washington.

In February 1992, the IJI government through its Foreign Secretary acknowledged three things: that Pakistan had acquired nuclear capability (but not the bomb), that the nuclear programme had been frozen at the 1989 level, and that a conscious political decision had been taken not to make the bomb. In August 1994, at Neela Butt, Nawaz Sharif kicked the nuclear football again. He claimed that Pakistan had a ready to deliver nuclear weapon. The response of the international community, so far, has been restrained. But this says nothing about next time.

The nuclear football players draw public cheers, but don't seem to realise that the future security of the country should not be a spectator sport. Each shot so far has been an own goal and only increases the score against Pakistan in the international community. .

Questions for a Nuclear Debate

In trying to decide where Pakistan's nuclear capability is to go from here, we must begin by formulating key strategic questions about national security and the nuclear issue, and rethink some of the basic assumptions underlying our theories of national security. This should be done without in anyway suggesting that GHQ (which identifies threats to security and formulates a response) is not aware of the imperatives of such an exercise. But it has to be public exercise rather than a limited military discussion.

A problem with the military mindset is that it militarises reality and perceives national security only in terms of the numbers of Army divisions, Air Force squadrons, naval frigates and submarines. It rarely occurs to the brass that if such were the dynamics of national security then smaller nations would not have existed alongside larger neighbours. For generals, air marshals, and admirals, the response to challenges of national security is gun for gun, bullet for bullet, bomber for bomber and submarine for submarine. This forgets other vital elements of state power such as human development, social cohesion, national integration and people's participation in the shaping of their own destinies. Did the Soviet Union not disintegrate because of the criminal neglect of the social and human dimensions of survival and development?

Related to this is another characteristic peculiar to the military mind. A former three star general once confided "we in the army know only how to spend, not how to earn." Beg, borrow or steal but give us money for weapons, this is the military's logic. That is why the former caretaker prime minister Moeen Qureshi once said "curtailing the military budget would amount to playing with fire." It was no idle warning.

It is in the light of this understanding that we must begin to ponder over a few strategic questions. Questions on the issues of security, disarmament and non-proliferation that have come to the centre of international relations. There are eight basic strategic questions.

First. Will Pakistan's security be enhanced or undermined by open acquisition of nuclear weapons and brandishing them? Will our acquisition of nuclear weapons deter or provoke India to do like-wise, and in that event whose security would be more undermined - India's or Pakistan's - keeping in view India's vast scientific, technological and nuclear infrastructure and geographical advantages?

Second. Is the overall cost of nuclear weapons development bearable for a country like Pakistan? This is the cost not simply of fabricating a crude device, but also of constantly improving and upgrading it, and building delivery systems. There are also the intangible costs of diplomatic and political isolation, lost opportunities of international cooperation, and the suspension of economic and military aid.

Third. Can a weapon of ultimate resort like the nuclear weapon be used in any eventuality? Since World War II it has not been used. Former US President Nixon has recalled

how on five different occasions he came close to deciding about using a nuclear weapon - three of these were over Vietnam - but each time after debate and reconsideration decided not to. Should a weapon which cannot be used be made at all, and that too at such exorbitant cost?

Fourth. Does the so-called theory of deterrence still hold good or does it need re-examination? History after Hiroshima begs the question : what if a nation is not deterred? Vietnam was not deterred by the US. Afghanistan could not be deterred by the mighty nuclear arsenal of the USSR. And more recently, Iraq was not deterred by US nuclear weapons, even though it was routed in the end by conventional military technology. Is there any sound basis for our presumption that India will be deterred, and not provoked, by a nuclear Pakistan?

Fifth. Granted that India is our enemy, is immoral and wicked, but is India mad enough to expose itself to unacceptable damage by starting a nuclear war with Pakistan?

Sixth. "In the event of first strike, India's conventional capability will be wiped out" claims General Beg. Sounds pleasing to the ears, but what if India strikes first, or absorbs the first strike and retaliates? Will we be able to withstand it?

Seventh. In spite of a universal clamour for a complete ban on nuclear testing, Britain and France are reluctant, they still consider testing of a nuclear weapon essential for inducting it into the war machine as a reliable weapon. This is because a battlefield nuclear weapon is vastly different from a nuclear device - which may have more propaganda but little strategic value. Pakistan's alleged nuclear device remains untested. What if the bluff is called and it turns out to be dud?

Eighth. We seek to link resolution of Kashmir with Pakistan's nuclear capability. But Kashmiris are fighting their own battle of liberation. How can we take Kashmiris for granted in a nuclear bargain with the US? What if tomorrow the Kashmiris demand the third option of independence and reject the Pakistani price?

These are only some of the strategic question. Answers to them are unlikely to come from discussions behind closed doors in GHQ or in the semi-lit corridors of the Foreign Office. Answers to them may be found by tearing apart the shroud of secrecy around ideas of national security and initiating an open public debate.

Appendix 1

How to Build the Bomb

Zia Mian

Introduction

Starting from the presumption that a state wishes to build nuclear weapons, or develop the capability to produce such weapons at very short notice, and that it wishes this activity to be a secret then there are a number of simple criteria that can be deduced as necessary conditions for such a project. The first important point is that in many cases whether a state can effectively covertly pursue and achieve a nuclear weapons capability is determined by non-technical factors. These include whether a state can organise, manage and carry through complex, long term projects requiring a large scientific and technological infrastructure.

How large and diverse this human and material base needs to be is not difficult to determine. The skills and experience needed for successfully designing and building a nuclear weapon are in the fields of metallurgy, chemistry, physics, electronics and explosives. A 1968 United Nations study suggests 1,300 engineers and 500 scientists would be needed to build the installations to produce nuclear warheads. These scientists, engineers and technicians would include; physicists, chemists, metallurgists, mathematicians, civil, mechanical and electronic engineers, skilled machine-tool operators, electricians, pipe fitters, welders, sheet-metal workers, furnace and chemical plant operators, instrument makers and fabricators (and of course administrators, and spies). A state engaged in this pursuit needs some background in each of these, or access to training for people in these disciplines, and enough activity in each of these fields to disguise the need for such personnel. This means the state requires certain industries, from mining, chemical and metallurgical to engineering and explosives.

The state also needs to be able to use international trade to purchase what it cannot produce. These may purchases will be a mixture of overt and covert transactions, this requires a network of international partners willing to do business, and a supply of foreign exchange that does not need to be accounted for. These can be met if the most important non-technical constraint, the need for a determined coalition of elite groups intent on pursuing nuclear weapons, is overcome. This need must be able to override other intra-elite concerns. These other concerns arise from the possibility of getting caught (possible international sanctions), and of course the consequences for broader social and economic development of the diversion of funding and skilled personnel. There are also implications for democracy and governance, since

all nuclear weapons development programmes have been carried out in total secrecy, without informing or seeking the consent of the population.

The Basis of the Bomb

There are three stages involved in making nuclear weapons. The first and most difficult is the production of the nuclear materials that constitute the prime feature of these weapons. The two key materials are substitutes for each other, and have different production problems. These materials are highly enriched uranium (enriched in the isotope uranium 235) and plutonium. These fissile materials are characterised by their property to sustain a nuclear chain reaction. That is their nuclei fission after absorbing an incident neutron of any energy, and crucially each nucleus as it fissions releases on average two or more neutrons, that can then induce other neighbouring (similar) nuclei of these elements to undergo fission.

To use either highly enriched uranium or plutonium to make a nuclear (fission) weapon requires that enough of either of these materials be obtained -- about 20 kg of uranium enriched to about 95% or more of uranium 235, and about 10 kg of plutonium. These amounts are necessary to form a critical mass permitting a chain reaction to occur. This material once produced must be melted, cast and machined in a controlled environment to very high specifications into a precise shape, to form a core (see below).

The second stage is design and manufacture of a system that will bring this critical mass together in a sufficiently small volume for long enough for the chain reaction to occur. This requires chemical explosives to compress the core of fissile material into a small volume, and other non-fissile materials that will hold the critical mass in place for long enough for the chain reaction to use up a substantial amount of the fissile material, before the energy released destroys the weapon.

This tamper also serves as a reflector, to reflect free neutrons, that are produced by fission and would otherwise escape, back into the fissile material. This tamper and reflector is made from natural or depleted uranium and beryllium. There is a need for electronic devices to set off the chemical explosive and a neutron generator, or initiator, that will initiate the chain reaction, at just the right moment - when the fissile material is compressed into the smallest volume, i.e. when the nuclei are as close to each other as they can get.

There are a few ways to increase the efficiency of the utilisation of the fissile material i.e. increase the yield. One method is to leave a small gap between the tamper and the core, the core is held in place at the centre of the bomb by thin struts. This serves to allow the chemical explosion to hit the tamper material and have time to build up speed before it hits and

compresses the fissile core material. A higher degree of compression is reached. It is known as levitation. The principle is that of swinging a hammer to hit a nail, rather than pushing it when it is in contact with the nail. The other process is to inject a small amount of deuterium and tritium in the very centre of the bomb as it is exploding, these materials undergo fusion as the bomb explodes, emitting neutrons that initiate fission in more of the uranium or plutonium nuclei. This boosting, while effective, is demanding in terms of weapons design and manufacture of components especially for the timing of the injection.

The chemical explosives pose a particular problem. There is need for an existing ordnance capability; including the ability to produce (or purchase) explosives, equipment for melting and casting this explosive into the desired shapes, or presses for shaping it into these shapes by pressure (depending on the explosive), and machining equipment to produce the precise curved shapes needed to produce a spherically symmetric shock wave that can evenly compress the nuclear material. Many tests of these explosives are needed to achieve the right composition and detonation properties. These tests need special test facilities, not normally associated with conventional ordnance, since at least 50 - 100 kg of explosive are involved. The equipment requirements are for high speed oscilloscopes, high speed cameras, and pulsed X-ray generators to be able to assess the properties of each detonation as it occurs - in real time.

The detonation package as a whole has to be tested, to ensure that the timing of the chemical explosion is followed at just the right moment by the neutron pulse from the neutron initiator, that triggers the chain reaction. These initiators are of two types. One uses radioactive substances (beryllium and polonium) and is placed at the centre of the core. The other type is an external initiator, it relies on collisions, leading to fusion, between deuterium and tritium induced by a high voltage inside a tube, to produce an intense pulse of neutrons. This latter, more advanced, type can be as small as the size of a fist. Similar small neutron generators are also used in drill holes by the oil and gas industry to study rocks at depth.

The chemical explosive has to be attached to the fissile material core, as the first step in assembly of the weapon. Since the high explosive may accidentally detonate, this has to be done in a specially blast-proofed area. This unit is then encased in a shell of stainless steel, aluminium or titanium. This whole assembly is known as the physics package. Then the other non-nuclear components are attached, the neutron initiator, the detonator switches, mechanical and electrical components etc.

The third stage in making a nuclear weapon small, robust, and reliable enough to be taken to a desired target, and to explode as and when desired, is to integrate it with a delivery system. This normally means either an aeroplane or a missile. This requires placing the weapon in a

bomb case or into a missile, with the appropriate fusing of the weapon, to detonate at a given altitude, or on contact with the ground.

Since it is reasonable to presume that a state is intent on building up a nuclear arsenal of some kind rather than just a demonstration weapon, there have to be arrangements for the specialised storage, handling and transport of these weapons at the site of assembly and the point of deployment (e.g. the airbase). This applies even if weapons are kept as unassembled components. There have to be facilities for assembling and transporting complete weapons should the need arise.

So far the description has been for a wooden bomb, one that treats the weapon as being totally reliable, with an infinite shelf life, and requiring no special handling or storage or surveillance. These are all required by real nuclear weapons. Maintenance of weapons means they periodically need to be disassembled, and this may mean replacing welds, soldered joints etc. The arming systems have to be checked. Individual components have to be tested, and replaced, and perhaps even the entire weapon, minus the physics package, field-tested. The physics package also has to be tested. The fissile material can corrode and the sensitivity and state of the chemical explosive can deteriorate, affecting other components such as the detonators. Any tritium in the weapon also needs to be replaced, since it has a short half-life, about 12 years.

Producing Nuclear Materials

Indigenous production of the nuclear materials needed to make nuclear weapons requires a large, complicated and expensive set of special facilities. It is the single biggest obstacle to building nuclear weapons. This is because naturally occurring uranium cannot be used to make a nuclear weapon. But it is the starting material for both the enriched uranium and for the plutonium that is used for weapons. A state therefore needs access to a supply of uranium, either as a natural resource or from the market.

Uranium ore contains, usually, less than a few tenths of a percent of uranium. The active ingredient, so to speak, the isotope uranium 235, is present at about 0.7% of the naturally occurring uranium. The uranium ore has to be mined, and milled, to make yellowcake. This is about 80% uranium. Yellowcake can then be further processed. The special nuclear materials, enriched uranium and plutonium, can be purchased (no known example yet), stolen (Israel), diverted from the civilian nuclear power programme (India), or produced by the state wanting to build the bomb (all declared nuclear states, South Africa, and Pakistan).

A straightforward way to produce plutonium for a nuclear weapon needs uranium mining, ore processing and conversion to a metal before fuel fabrication. This is placed in a dedicated nuclear reactor, i.e. one not to be used to make electricity, in which a part of this uranium can be converted into plutonium - otherwise the plutonium produced is not of very high grade (the longer it stays in the reactor, the lower its grade - but all plutonium can be used to make bomb). A process for recovery of this plutonium from the used reactor fuel material is also needed. A higher grade of plutonium can be produced in such a reactor if enriched rather than natural uranium is used in the fuel. In either case this plutonium has to be converted a metal and then melted, cast and machined into a sphere, without exposing it to air.

If a state chooses to pursue a uranium enrichment route, perhaps because it cannot build its own nuclear reactor, or extract the plutonium from reactor fuel, then it needs its yellowcake turned into a gas, uranium hexafluoride. This can then be subjected to a variety of physical processes to enrich the level of uranium 235. The use of centrifuges is just one such process. Most of the technology for enrichment is specialised, especially that for handling the gas, which is corrosive. All components, and some of the materials, used in building such centrifuges are regulated by export controls put in place by the Nuclear Suppliers Group countries. These therefore have to be bought illicitly, or produced indigenously. The enriched uranium is turned into uranium metal, and has to be melted, cast and machined into a core.

The costs of these two routes to nuclear weapons are difficult to assess accurately, especially for third world countries, and for differing degrees of reliance on secret purchases etc. But for an overt, i.e. publicly acknowledged open nuclear weapons programme relying on plutonium, one estimate (by the United States Congress Office of Technology Assessment) is between $120 - $300 million for the first weapon. The reprocessing of nuclear fuel would be the most difficult step, because the fuel is very radioactive. For enriched uranium, excluding the research and development costs, the cost of constructing a centrifuge enrichment facility able to produce a few hundred kg of highly enriched uranium a year is estimated as $100 - $500 million, in $1992.

Appendix 2

A Nuclear Glossary

Atomic Bomb (Fission Bomb) : Nuclear warhead consisting of an explosive device whose energy comes from the fissioning of uranium (U) or plutonium (Pu). The uranium or plutonium is brought to a critical mass under pressure from a chemical explosive detonation. The resultant atomic explosion produces blast, heat, and nuclear radiation. The complete fission of one kg of fissionable material would have a yield equivalent to nearly 18,000 tonnes of the conventional chemical explosive TNT.

Atomic Nucleus : The central core of an atom, containing almost all the mass, and consisting of protons and neutrons.

Ballistic Missile : A missile that follows a ballistic trajectory (like an arrow), relying only on gravity and atmospheric drag when the thrust from its engine stops.

Boosted Weapon : A nuclear weapon in which neutrons produced by fusion reactions enhance the fission process, giving a larger explosive power from the same amount of fissile material.

Calutron : A device for separating isotopes using strong electric and magnetic fields. Iraq was discovered to be using calutrons as part of its uranium enrichment effort.

Centrifuge : A rotating cylinder that can be used for enrichment of uranium hexafluoride gas. The heavier uranium isotope uranium-238 (U-238) tends to concentrate at the walls of the rotating centrifuge, leaving uranium enriched in the lighter isotope uranium-235 (U-235) near the centre.

Chain Reaction : A series of nuclear reactions in fissionable material in which neutrons produced by fission reactions induce further fissions.

Critical Mass : The least mass of fissionable material that will allow a self-sustaining nuclear chain reaction. The critical mass depends on the type of fissionable material, its chemical form, geometry, and density.

Delivery System : A vehicle, usually an aircraft or missile, with all its associated components and installations, for transporting, launching, targeting, and guiding nuclear weapons to a target.

Enrichment : Increasing the concentration of one isotope of an element relative to the other isotopes. For example, U-235 relative to U-238.

First-Strike : A surprise nuclear attack on an opponent as part of a pre-emptive strategy to destroy the other side's capability to use nuclear weapons. Sometimes used to mean first-use; the use of nuclear weapons in war as a response to a conventional attack. A no-first-use policy commits a country not to be the first to use nuclear weapons in a conflict.

Fissile Material : An isotope that readily fissions after absorbing a slow neutron, emitting 2 to 3 neutrons. Fissile materials are U-235, U-233, Pu-239 and Pu-241.

Fission : The splitting of the nucleus of an atom, following absorption of a neutron, into two lighter nuclei, accompanied by the release of neutrons, and radiation.

Fissionable Material : A material that will undergo nuclear fission. Includes fissile material, but also isotopes such as U-238 that are fissioned only by fast neutrons.

Fusion : The process in which two light nuclei atoms, usually isotopes of hydrogen, combine to form a heavier nucleus with the release of a substantial amount of energy. Extremely high temperatures are required to initiate fusion reactions.

Heavy Water : Water containing significantly more than the natural proportion (1 part in 6500) of deuterium atoms to ordinary hydrogen atoms.

Hydrogen Bomb (Fusion Bomb, Thermonuclear bomb) : Nuclear warhead containing an explosive device whose energy comes from the fusion of the isotopes of hydrogen (deuterium and tritium). These are brought to critical density and temperature by use of an atomic bomb, that initiates and sustains a rapid fusion reaction, which in turn creates an explosion that produces blast, heat, and nuclear radiation.

Insensitive High Explosive : Advanced chemical explosives that are relatively insensitive to sudden shocks and heat. They are less likely to detonate accidentally and therefore enhance the safety of nuclear weapons.

Isotopes : Atoms of the same chemical element having different numbers of neutrons in their nucleus. An isotope is specified by a symbol denoting the chemical element, and its atomic number, e.g. U-235 for uranium with 235 neutrons and protons.

Kiloton : The energy of a nuclear explosion that is equivalent to the explosion of 1000 tons of trinitrotoluene (TNT) high explosive. The US atomic bomb that destroyed the Japanese city of Hiroshima in August 1945 had a yield of about thirteen kilotons.

Launch-on-Warning : The act of launching a retaliatory attack solely on receipt of a warning that an opponent has launched an attack.

Manhattan Project : The secret US project during World War II to invent, design, assemble and test the first atomic bomb.

Megaton : A measure of the explosive yield of a nuclear weapon equivalent to one million tons of TNT high explosive.

Nuclear Arms Race : The increase in the numbers and destructive power of nuclear weapons in the arsenals of hostile nuclear weapons states as a consequence of their hostility, which creates and is maintained by institutions with a vested interest in a permanent war economy - the standard model is that of the USA and the former Soviet Union.

Nuclear Capability : A measure of the state of development of the nuclear weapons programme of a threshold nuclear weapons state. Particularly important is the amount of weapons-usable fissile material that it has accumulated, and whether it has designed, assembled and exploded a prototype nuclear device.

Nuclear Deterrence : The idea that nuclear weapons are capable of inflicting so much destruction that countries possessing them and willing (and able) to use them will not go to war against each other, in effect that the fear created by the possession and threat to use nuclear weapons can maintain peace.

Nuclear Device : Nuclear fission or fission and fusion materials, together with arming, fusing, firing, chemical explosive, and other equipment that do not yet constitute an operational weapon.

Nuclear Hawk : An advocate of nuclear deterrence who actively argues for increasing the role of nuclear weapons in military planning.

Nuclear Reactor : A device in which a controlled self-sustaining nuclear reaction can be maintained. Nuclear power reactors are used for producing electricity.

Nuclear Weapon (Nuclear Bomb) : A device that releases nuclear energy in an explosive manner as the result of nuclear reactions involving the fission or fusion, of atomic nuclei, or both.

Neutron : An elementary particle that is electrically neutral and plays a key role in nuclear reactions.

One-Point-Safe : A term to describe the degree of safety in a nuclear weapon. More precisely, it is the condition that the probability of detonation of the high explosive of a nuclear weapon starting at any one point has a chance of no greater than one in a million of producing a nuclear yield in excess of a few kg TNT equivalent.

Permissive Action Link : A device included in or attached to a nuclear weapon system to prevent its arming and or launching until the insertion of a prescribed code or combination.

Plutonium : A heavy, man-made, radioactive element (symbol Pu). The most important isotopes are Pu-238 and Pu-239. Pu-239 is produced from uranium-238 in a nuclear reactor, and is used in nuclear weapons.

Radiation : Particles and electromagnetic radiation (such as X-rays) emitted from atomic nuclei in various nuclear processes.

Radioactivity : The spontaneous disintegration of an unstable atomic nucleus resulting in the emission of various kinds of particles and radiation.

Roll-back : The dismantling of a country's nuclear weapons capability, as part of the process of nuclear disarmament for threshold nuclear weapons states.

Second-Strike : The use of nuclear weapons in retaliation for a nuclear attack.

Threshold Nuclear Weapons State : (or de facto nuclear weapons state) refers to Israel, India and Pakistan, all of whom are believed to have the capability to deploy nuclear weapons. They are distinguished from the declared nuclear weapons states; USA, Russia, China, Britain and France.

Uranium : A naturally occurring radioactive element (U), the principal isotopes being U-235 and U-238.

Uranium-235 : The only naturally occurring fissile isotope. Natural uranium has 0.7% of U-235. Nuclear reactors use natural or enriched uranium as fuel, nuclear weapons use uranium enriched to about 93% U-235.

Uranium - Depleted : Uranium having a concentration of U-235 lower than found in nature (0.711%)

Warhead : That part of a missile, bomb, etc., containing the nuclear or thermonuclear (or chemical or biological) system intended to inflict damage.

Yield : The energy released in a nuclear explosion, usually expressed as the number of tons of TNT releasing the same amount of energy.

Zero-Yield Test : Experimental tests of a fission weapon in which part of the uranium or plutonium is replaced with a passive material, slowing down the chain reaction and destroying the weapon before a substantial amount of nuclear energy is released.

This glossary is adapted from a number of existing such lists. It draws most heavily on the glossaries published as part of the Nuclear Weapons Databook series of the Natural Resources Defence Council, Inc.

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