



INDIAN NUCLEAR WEAPONS: COSTS VS. BENEFITS

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Abstract

India both has nuclear weapons and a lot of knowledge about how the nuclear fuel cycle works. Even though India did its first nuclear test in May 1974, the country has not signed either the Non-Proliferation Treaty (NPT) or the Comprehensive Nuclear Test Ban Treaty (CTBT). (CTBT). India's agreement with the International Atomic Energy Agency (IAEA) for facility-specific safeguards and its exemption from the Nuclear Suppliers Group allow it to trade in civilian nuclear technology on a worldwide scale (NSG). Each agreement must be in place for participation to take place. Years of conflict with its nuclear-armed neighbour Pakistan have contributed to India's huge and growing nuclear arsenal. Successive Indian governments have stuck to a policy of nuclear ambiguity after a 1974 nuclear test that only had limited success. The lack of clarity in this policy has continued for years. However, in May 1998, India conducted a series of highly publicised nuclear tests, solidifying the country's image as the nuclear-weapons power it claimed to be. India has not signed either the Nuclear Non-Proliferation Treaty (NPT) or the Comprehensive Nuclear-Test-Ban Treaty. Similarly to Pakistan, India has said repeatedly that it would not join the NPT as a nuclear-weapon-free state. This is because the NPT unfairly favours the five countries officially recognised as holding nuclear weapons (known as the P5) over the other countries, who are obligated to forgo the possibility to acquire such weapons. Many rough recommendations for "limiting nuclear hazard" have been offered by the Indian envoy to the United Nations. The "actions to lessen the possibility for unintended and accidental deployment of nuclear weapons, including dealerting and detargeting," are part of the draught ideas. While other countries have been signing the NPT, India has refused to do so, claiming that "nuclear weapons are critical to our national security and will remain so until their universal abolition." India has always said it will not deploy nuclear weapons first. The Indian Minister of Defense, Rajnath Singh, created the impression that India's "no first use" policy would not be maintained indefinitely when he delivered prepared words at the Pokhran nuclear test site in August 2019.

Keywords:Nuclear Weapons, India, International Reaction, Biological Weapons, Thermonuclear Weapons



Introduction

Even though it's been a while since the nuclear blasts at Pokhran and the Chagai Hills in May 1998, the world is still feeling the effects. When India and Pakistan got nuclear weapons, they became part of the most powerful group in the world. This group is made up of only the five countries that have nuclear weapons (NWS). It is clear that the NWS won't let the two new nuclear powers join forces. India already has nuclear weapons, so it doesn't have to give them up. It might seem strange to do this. India's position has been the same for a long time: the P-5 must agree to implement a time-bound plan for getting rid of nuclear weapons. India's point of view needs to be heard by the G-8 and the P-5. India is already a nuclear power, so it has to fight against the unfair NPT, CTBT, and proposed FMCT. In a society where Realpolitik is the norm, a soft word doesn't mean much unless it's followed by a big stick. Now, more than ever, it is important for India to fine-tune its nuclear strategy and doctrine and set up a balanced, clearly visible nuclear force organisation with a working command and control structure to make sure that its declared minimum deterrent is real. (Laucht, 2012)

The country's nuclear force should be based on the Indian government's nuclear policy and national security strategy. The nuclear deterrent must be based on India's goal of "no first use" and be ready to deliver "punitive retribution" if India's citizens, military, or infrastructure are attacked with nuclear weapons. Like any other military force structure, a nuclear force structure needs to be dynamic and flexible enough to keep up with changes in technology. Because nuclear weapons and their delivery systems depend so much on cutting-edge technology, this safety measure is especially important. India's nuclear force structure should be flexible enough to allow for new bilateral or multilateral deals as the government's view of threats changes. If the P-5 and other nuclear weapons states (NWS) decide to get rid of all of their nuclear weapons in the next few decades, India's nuclear force should also be easy to dismantle. India wants to get rid of all nuclear weapons as part of its foreign policy. (Herrera, 2009)

Objectives

1. Discuss about Biological Weapons, Chemical Weapons and Thermonuclear Weapons.
2. Discuss about The International Reaction
3. Discuss about India and Its Neighbors' Nuclear Capabilities

The International Reaction

How the rest of the world reacted to India's nuclear tests revealed how much India may have to pay in terms of its economic and foreign policy in the future years. It has made it more difficult



to predict whether India's economic reforms would succeed or not. Some individuals are concerned about the short-term consequences of the economic sanctions on India. This is because the Indian economy has stagnated and reforms are proceeding at a slower rate than previously. However, the ruling BJP alliance believes that the world's largest countries would not join forces to economically isolate India from the rest of the globe. Even though the European Union has issued veiled threats, it is very doubtful that Europeans would join the United States in implementing sweeping economic penalties on India. Even if Japan has shut off funding to India in a similar manner to the United States, there is optimism that Tokyo will not go all the way. Multilateral institutions have suspended loans, but there remains a substantial amount of aid that has not yet been distributed that might be used. However, India's largest trading partner and foreign direct investment, the United States, is implementing unavoidable sanctions. However, it is believed that U.S. businesses might be used to restrict how these sanctions are construed, and that the magnitude of the Indian market would ultimately limit the duration of U.S. sanctions. The immediate political consequences are more obvious and apparent, particularly in terms of ties with major powers and other nations in the region. India has created an extended period of uncertainty in its ties with the United States, China, and Pakistan. The Clinton Administration is infuriated because it was preparing for President Clinton's trip to the Subcontinent later this year and anticipated that the new administration would not alter the nuclear issue. This is exacerbated by the fact that it has been unable to determine the BJP's political stance or how it is preparing for the exam. After a rocky start in the early 1990s, Indo-American ties have been improving, and President Clinton's visit might have elevated them to a higher level. That does not seem probable at this time. India and China's relationship continues to deteriorate. Before the tests, India's defence minister, George Fernandes, a lifelong socialist, opponent of Chinese communists, and backer of independence in Tibet and Myanmar, spoke at length about China's threat. Even while many in the Indian strategic community agree with his beliefs on the long-term danger posed by China and its expanding strategic role in the subcontinent and surrounding region, the manner in which he expressed them has produced fresh strains in the Sino-Indian relationship.(Rhodes, 2004)

In addition, when the Prime Minister said that China posed a danger and was providing Pakistan with nuclear weapons and missiles, the Chinese were enraged. Beijing was enraged by India's nuclear tests, and India was accused of aiming to take over the region and launch a nuclear arms race on the subcontinent. It did not denounce Pakistan's nuclear tests, which followed India's, since it saw them as a logical reaction. China has requested that India cease production of missiles and nuclear weapons. New Delhi views Beijing's response as an effort to retain China as the sole recognised nuclear power in Asia, to prevent New Delhi from making Asia more multipolar, to keep India bound to the subcontinent, and to use the world reaction to push India



to relinquish its nuclear weapons. India's nuclear tests might make long-term relations between China and India difficult. New Delhi is pleased with France and Russia's replies to India's nuclear tests and how they helped temper certain G-8, P-5, and UN Security Council pronouncements. India has enjoyed solid connections with Russia for a very long time, but these tests might allow India's political and commercial ties with France to expand significantly. However, it is evident that Moscow and Paris can only do so much to alter the global discourse around India's nuclear tests. France and Russia want to maintain the present non-proliferation system, despite the fact that they have ceased discussing the imposition of more sanctions on India. The P-5 and the UNSC have said in their comments that they are resolved to prevent India and Pakistan from being recognised as nuclear weapon states in light of their recent nuclear tests.(Shultz & Goodby, 2015)

Biological Weapons

India has agreed to follow the rules of the Biological Weapons Convention (BWC) now that it is a member of it. There is no direct or indirect evidence that a BW programme is wrong. Neither of these types of evidence is clear. India has the scientific knowledge and equipment it needs to start a strong BW programme. India can also make aerosols and has a wide range of ways to deliver them, from simple crop dusters to high-tech ballistic missiles. (Weart, 2012)

There is nothing in the public record to suggest that the Indian government wants to move biological agents using these or any other methods. In October 2002, the President of India at the time, A. P. J. Abdul Kalam, said, "To emphasise what I just said, I will say this: "In India, it is against the law to use live animals to make weapons. The results are very bad for people." (Bethe, 2003)



Land-based ballistic missiles

Name	Type	Range (km)	Status
Prithvi-I	Short-range ballistic missile	150	Deployed
Prithvi-II	Short-range ballistic missile	250–350	
Prithvi-III	Short-range ballistic missile	350–600	
Agni-I	Medium-range ballistic missile	700	
Shaurya	Medium-range ballistic missile	700–1900	
Agni-P	Medium-range ballistic missile	1,000–2,000	
Agni-II	Medium-range ballistic missile	2,000–3,000	
Agni-III	Intermediate-range ballistic missile	3,500–5,000	
Agni-IV	Intermediate-range ballistic missile	4000	
Agni-V	Intercontinental ballistic missile	5,000–8,000	
Agni-VI	Intercontinental ballistic missile & MIRV capable	8,000–12,000	Under development

Chemical Weapons

In 1993, India was one of the first countries to sign the Chemical Weapons Convention (CWC). Two years later, on September 2, 1996, they were officially a part of the deal. General Sundarji, who used to be the head of India's armed forces, is said to have said that a country that can make nuclear weapons doesn't need chemical weapons, since countries that don't have nuclear weapons are more likely to worry about chemical weapons. Others have said that India's decision to get rid of its chemical weapons shows that the country has a lot of faith in its other weapons. (Burns, 2002)

India told the rest of the world in June 1997 that it had chemical weapons. (1,045 tonnes of sulphur mustard). By the end of 2006, India had got rid of more than 75% of its chemical weapons and materials. Since the end of 2006, India has had until the end of April 2009 to get rid of its remaining chemical weapons and materials. It was supposed to have gotten rid of all of its chemical weapons and materials by that time. In May 2009, India told the United Nations that it had followed the rules of the international Chemical Weapons Convention and gotten rid of all of its chemical weapons. India is the third country to do this. South Korea and Albania were the first two. Inspectors from the United Nations did a second check on this. India's chemical business is very well-developed, and most of the chemicals it needs for its own market are made there. Also, everyone knows that India has a large civilian chemical and pharmaceutical industry and that the country sends a lot of chemicals to other countries every



year, including the United Kingdom, the United States, and Taiwan. Taiwan is one of the places that buys a lot of chemicals from India. (Burns J. , 2003)

Nuclear weapons

Nehru was against nuclear weapons in public, but he pushed for a nuclear energy programme for civilian use, which made it easier to make nuclear bombs. We did this because we thought that our everyday weapons were better than those of China and Pakistan. In 1956, India built its first research reactor, and in 1964, it built its first unit for reprocessing plutonium. Homi Jehangir Bhabha started India's nuclear programme in 1944 by opening a nuclear research centre called the Tata Institute of Fundamental Research. (Douglas,, 2002)

After the short standoff at the Himalayan border in October 1962, New Delhi's leaders felt they had to make nuclear weapons to stop a future invasion by China. By 1964, India had the technology to make nuclear weapons. Even though Prime Minister Lal Bahadur Shastri was against making nuclear weapons at first, he eventually gave in after being put under a lot of political pressure, especially from the Indian National Congress. India's safety could not be guaranteed by either the US or the USSR. Shastri has said that India will work toward being able to do "peaceful nuclear explosions" in the future. (Douglas G. , 2019)

Prime Minister Indira Gandhi oversaw India's first nuclear test in 1974 (codenamed "Smiling Buddha"), which was intended to be a safe nuclear explosion. The CIRUS reactor, given by Canada, was used to manufacture the plutonium used in the test, raising worries that peaceful nuclear technology may be diverted for military use. The Nuclear Suppliers Group was also established as a direct consequence of this. Indira Gandhi, Morarji Desai, and Rajiv Gandhi were all vocal opponents of expanding India's nuclear project beyond PNEs and theoretical studies in the 1970s and 1980s. Indira Gandhi said no when asked in 1982 if the Defense Research and Development Organisation could make nuclear weapons that could be used. She did, however, agree to the Integrated Guided Missile Development Programme, which would make missiles that could carry nuclear weapons if India ever made one. India also supported international efforts to get rid of nuclear weapons and keep control of them. (Haidar, 2002)

Thermonuclear Weapons

India said it had successfully set off a thermonuclear bomb on May 11, 1998, as part of its Operation Shakti (also called "Shakti-I") tests. A Pakistani nuclear physicist named Samar Mubarakmand says that the goal of the Shakti-I test, which was to make a thermonuclear



explosion, was not met. Former director of the Los Alamos National Laboratory, Harold M. Agnew, agreed that India set off a fake thermonuclear bomb. Due of its close vicinity to the Khetolai hamlet, India maintains that it only tested a thermonuclear bomb at a controlled yield of 45 kt (190 TJ). Radioactive fallout from explosions greater than 45 kilotons has also been speculated to have been contained. Former Atomic Energy Commission chief Rajagopala Chidambaram said after the Pokhran-II tests that India could produce thermonuclear weapons of "any yield." The scientific community in India, as well as specialists from other countries, have conflicting opinions about the yield of India's hydrogen bomb test. Both the politicisation of the problem and the discussions among the various Indian experts contributed to the escalation of tensions. (Kristensen & Norris, 2003)

K. Santhanam, who managed the test site preparations in 1998, said in an interview that India shouldn't sign the CTBT quickly since the yield of the thermonuclear explosion was lower than expected. He also implied that this was one of India's reasons for conducting the test. K. Santhanam's claim has been disputed by other Indian researchers who took part in the experiment. These experts have put doubt on Santhanam's assertions because they don't believe they're grounded in science. Despite the Indian government's claim that the country produced 56 kilotonnes of TNT (230 TJ), British seismologist Roger Clarke noted that the magnitudes suggested a combined production of up to 60 kilotonnes of TNT (250 TJ). Findings by American seismologist Jack Everndenshow that taking into consideration geological and seismological differences between the test site and the target location is vital for precise yield estimate. (Reuters, 2018)

India and Its Neighbors' Nuclear Capabilities

Because almost all countries with nuclear weapons keep their research and development programmes very secret, it is very hard for an analyst to get a good idea of how many nuclear warheads a nuclear weapons state has (NWS). This is because the research and development programmes for nuclear weapons are secret (NWS). It is common practise for these estimates to be based on the NWS's "notional stockpile" of unprotected enriched uranium or plutonium. These numbers are based on estimates, so you should be careful when using them. It is very hard to figure out how many fission and thermonuclear warheads a NWS may have in total. This is because the same amount of fissionable material can be used to make as many thermonuclear bombs as pure fission bombs or even boosted fission bombs, but with much higher yields. This means that a NWS can make a larger number of thermonuclear bombs. This is because the yields of thermonuclear bombs are much higher than those of fission bombs. But



if the same method of calculation is used throughout the process, it is possible to get an estimate with the same amount of error. Using these estimates, it should be possible to figure out nuclear parity.(Chengappa, 2000)

India

Following the nuclear tests at Pokhran-II in May of 1998, the chairman of India's Atomic Energy Commission (AEC), Dr.Rajagopala Chidambaram, said in an interview that India is capable of creating and manufacturing nuclear weapons of any size or kind.This also applies to neutron bombs. According to what Bharat Karnad has said, "The US Congressional Research Service calculated that by the year 2000, India will have generated enough unguarded fissile material to construct 400 warheads at an annual production rate of 127 kg. If all of this stuff were converted into fission (nuclear) weapons by the end of the century, its combined destructive power would be nearly three times as big as if it were only fused, at... 10.317 megatons of TNT." Title of Article "As of the end of 1998, the Institute for Science and International Security (ISIS) in Washington calculated that India's stockpile of weapons-grade plutonium (with a Plutonium-239 isotope concentration of more than 93 percent) weighed in at roughly 290 kg. The document claims that India's weapons-grade plutonium stockpile is determined by starting with the total reactor output of the nation and subtracting any "drawdowns" due to nuclear testing, processing losses, or civilian uses." The actual amount of fissile material on hand may be anything from 200 to 400 kg, with 290 kg serving as a median estimate. In July 1998, Dr. David Albright of ISIS assessed that India had 370 kg of weapons-grade plutonium, which would amount to around 74 nuclear bombs. Bharat Karnad's statistics vary from these estimates.(Abraham, 2001)

Table 1. Nuclear Tests at a Glance

	US	Russia	France	UK	China	India
Number of Tests	1,032	715	210	45	45	6
First Explosion	1945	1946	1961	1952	1964	1974
Last Explosion	1992	1990	1996	1991	1996	1998
Nuclear Warheads	12,070*	22,500*	500*	380*	450*	65*
* Estimates. (Source: The Bulletin of Atomic Scientists.)						

W. P. S. Sidhu stated in Jane's Intelligence Review shortly after India's nuclear tests in May 1998 that the country had built anywhere from 20 to 60 bombs using weapons-grade plutonium



re-processed from fuel extracted from the Trombay research reactors. According to Sidhu, "at least 390 nuclear bombs and as many as 470 warheads" may be made in India using the plutonium generated in the country's commercial reactors. As R. Ramachandran puts it, "unlike weapons-grade Pu-239 from research reactors, reactor-grade plutonium contains a large proportion of spontaneously fissionable Pu-240 and yields only 'dirty' bombs." According to his calculations, India might have enough plutonium for thirty bombs, and "A acceptable upper band would... be thirty-five." It would be counterproductive to India's quick breeder development if reactor-grade plutonium were diverted to produce nuclear weapons. The amount of India's nuclear arsenal has been estimated to range from 25 to 64 warheads by Indian media.(Perkovich, 2003)

George Perkovich was informed by reliable Indian sources that on May 11, 1998, a low-yield device was tested in Pokhran with reactor-grade plutonium. He estimates that by 1998 India had "probably about 250 to 300 kg by 1998... this stockpile could approximately feed fifty warheads" of plutonium that could be used to power nuclear bombs. India's ability to produce and stockpile nuclear warheads, as well as the quantitative content of its deterrent, would significantly improve if it were to add about 600 kilogrammes of reactor-grade plutonium to its stockpile, and if actual tests in May 1998 confirmed that the difficulties associated with designing nuclear warheads using such fissile material had been overcome. The quantity of plutonium in India's stockpile would also be higher. The amount of its deterrence would expand dramatically as a consequence of this. Due to the lack of transparency around these concerns, resolving this dispute will take a considerable period of time. In order to publicise India's progress in the development of nuclear weapons, the Kargil Review Committee recommended that the Indian government publish a White Paper. It would be to one's benefit to behave in this way.(Pahuja, 2001)

Conclusion

- Concerns over the safety of the surrounding region, primarily Pakistan but also, to a growing degree, China, are the primary motivating factor for India's nuclear strategy. In a word, India adheres to a doctrine known as credible minimum deterrence, which mandates that the country would never be the first to deploy nuclear weapons.
- continues to produce fissile material of a grade that is appropriate for use in weapons.
- has a growing stockpile of 160 warheads at this moment, according to recent reports.
- Is not a signatory to either the Treaty on the Non-Proliferation of Nuclear Weapons or the Treaty on the Comprehensive Ban on Nuclear Tests (CTBT).



- is exerting a lot of effort to improve the delivery capabilities it already has. India is now considered to have completed what is known as the "nuclear triad" after the first deterrent patrol of a brand modern ballistic missile submarine (SSBN) in the year 2018. This is a reference to the fact that India's nuclear capabilities may now be deployed by troops that are stationed in the air, on land, or in the water.

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