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# HISTORY OF NUCLEAR DEVELOPMENT: FROM THE SMILING BUDDHA TO PRESENT CAPABILITIES

**Sanjoy Hembram**

*Independent Research Scholar, Department of Political Science*

*Email Id- sanjoyh302@gmail.com*

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***Abstract***

*The history of India's atomic energy was initially bound by a commitment to peaceful uses. This journey began with the establishment of the Atomic Energy Commission of India in 1948. In the post-independence period, Prime Minister Jawaharlal Nehru considered atomic energy as an important component of national development. Nehru emphasized the use of atomic energy for peaceful purposes and promised to use it for scientific research, agriculture, healthcare and industrial development of the country. During this period, several important steps were taken to lay the foundation for India's nuclear program. The first nuclear research center was established at Trombay (now Bhabha Atomic Research Center or BARC). Along with research on atomic energy, various projects were started here. The Trombay center became the backbone of India's nuclear program. Under Nehru's leadership, India emphasized international cooperation and developed alliances with various countries to acquire nuclear technology. A notable example of cooperation with Canada was seen in the 1950s. The first CANDU Reactor was built in India with the help of Canada. The project was used for peaceful purposes of power generation and scientific research.*

***Key-Words:*** *Enery, Nuclear, Strategic, Weapon, Science, Capabilities etc.*

## Introduction:

After the establishment of the Atomic Energy Commission, Dr. Homi Jahangir Bhabha took over the leadership of India's nuclear program. He is called the 'Father of India's Nuclear Program'. Bhabha and his colleagues were committed to the peaceful use of nuclear energy. They believed that nuclear energy could meet the country's energy needs and could be an important tool for economic development. At that time, India was not interested in developing nuclear weapons. Rather, it wanted to improve the quality of life of the common people of the

country by applying nuclear energy in agriculture, medicine and industry. This commitment became a fundamental aspect of India's nuclear policy. However, India's efforts in peaceful nuclear energy faced challenges at various times due to international politics. In particular, in the 1950s and 1960s, the threat of nuclear proliferation became a major concern in the international community. However, India remained committed to keeping its nuclear program peaceful. This early phase of India's nuclear programme laid a strong foundation. Later, when the country faced security challenges, it became an effective vehicle for developing nuclear weapons. However, the commitment to peaceful nuclear energy adopted during Nehru's time remained the foundation of India's nuclear policy.

The early phase of India's nuclear power was built on a commitment to peaceful development and international cooperation. The policies adopted during this phase have served as a solid foundation for the development of India's nuclear programme later on.

**Early Phase: Commitment to Peaceful Nuclear Energy**

India's nuclear power development began in 1948, when the Atomic Energy Commission was formed. At that time, Prime Minister Jawaharlal Nehru emphasized the use of nuclear energy for peaceful purposes. His vision was that nuclear energy would be used for scientific research and industrial development in the country. India's first nuclear research centre was set up at Trombay. In the 1950s, a nuclear project called the 'Kandu Reactor' was started with the help of Canada.

**Smiling Buddha: The First Nuclear Test**:

India's first nuclear test, known as 'Smiling Buddha', conducted in Pokhran, Rajasthan in 1974, was a landmark event in the history of India's nuclear program. Through this test, India demonstrated its nuclear technology and capability to use energy on the international stage for the first time.

"Smiling Buddha" was an important message from India. On the one hand, it showed that India was committed to the use of nuclear energy for peaceful purposes, on the other hand, it indicated that the country also had the capability to use this technology for defense purposes if necessary. For India, it was not only technological, but also a significant achievement in strategic and political terms. The test was conducted under the leadership of Prime Minister Indira Gandhi. The border conflict with China in 1962 and the war with Pakistan in 1971 showed the need to reassess India's strategic position. China's 1964 nuclear test and the growing threat of a nuclear arms race became a major concern for India. In this context, India felt the need to ensure its nuclear power capability.

On 18 May 1974, the first nuclear test was successfully conducted in Pokhran. It was known as the "Peaceful Nuclear Explosion" (PNE). The government claimed that the test was conducted for peaceful purposes only. However, the international community, especially the Western countries, reacted negatively to India's move. Immediately after the test, the United States and other Western countries imposed strict sanctions against India. Various steps were taken to deprive India of technological and scientific cooperation. Organizations like the Nuclear Suppliers Group (NSG) were formed, which mainly worked to limit the access of countries like India to nuclear technology and materials. Although this international reaction became a major challenge for India's nuclear program, India did not deviate from its goal. On the contrary, these sanctions further motivated India to become self-reliant. The country focused on developing its own technology and capabilities. Indian scientists overcame the obstacles of sanctions and took the country's nuclear power program forward.

"Smiling Buddha" was not just a technological achievement for India, it was a political and strategic statement. It showed that India was ready to take any action to ensure its security and protect its national interests. This test established India as a nuclear power on the world stage. However, this move had a negative side. The test and the resulting sanctions slowed down the progress of India's nuclear program somewhat. India had to spend a lot of time and resources to reduce its dependence on international technology and materials. Later, the "Smiling Buddha" became the cornerstone of India's nuclear policy. It set a milestone in the country's defense and security. The impact of this test in 1974 still plays an important role in India's nuclear policy and strategic position.

In conclusion, the "Smiling Buddha" was not just a nuclear test for India, it was a symbol of self-reliance, strategic capability, and commitment to national security. With this test, India took its nuclear program to new heights and emerged as a strong and self-reliant country.

**Pokhran-II test of 1998**

The Pokhran-II nuclear test of 1998 was an important and revolutionary milestone in the history of Indian nuclear power. It opened a new horizon for India's nuclear program, where the country not only sought to develop a peaceful nuclear power, but also declared its goal of developing powerful nuclear weapons for defense and strategic purposes. The test was a national success for India and gave India a new identity in the global political context. On May 11, 1998, India's nuclear test was conducted in the plains of Pokhran in the state of Rajasthan. The test was part of two major tests: first, a "Peaceful Nuclear Explosion" (PNE) and second, a "Military Nuclear Explosion" (MNE). India conducted its first nuclear test in 24 years after

the "Smiling Buddha" test in 1974, which caused a stir worldwide. The test marked a major shift in India's nuclear capabilities and defense technology. Although the Indian government had promised to conduct the test for peaceful purposes before the test, its main objective was to establish a strong position in strategic security and defense. Through this, India proved that it now had the capability to produce and use nuclear weapons and was ready to apply it in the interests of national security.

The test was also a political strategy for India. Before 1998, China and Pakistan had established themselves as nuclear powers, which prompted India to build a strong defense system. In particular, Pakistan's nuclear weapons tests became a pressing issue for India, and as a result, India took an urgent step towards its nuclear weapons program. The Pokhran-11 test caused some major international reactions for India. The United States, the European Union, and other countries strongly criticized India's test and began to subject India to international sanctions. Although these sanctions created some obstacles to India's economy and technology, India was able to move further towards the development of its nuclear power and self-reliance. India took these obstacles as a challenge, and the country's scientists and researchers began to work in more independent and innovative ways in nuclear technology. After the Pokhran-II test, India took a special position in nuclear arms control and defense policy. After conducting nuclear tests in 1998, India clarified its position on the Non-Proliferation Treaty (NPT) and the Comprehensive Nuclear-Test-Ban Treaty (CTBT). India refused to join these treaties, believing that these treaties legitimize the existence and rights of nuclear-weapon states, but limit the rights of other states to possess nuclear weapons. India later formulated a "Nuclear Doctrine", which served as a defensive strategy. The core of India's nuclear doctrine was the principle of "Minimum Credible Deterrence", which meant that India would use its nuclear weapons only for defensive purposes and would not threaten any other country with a nuclear attack. As a result of the Pokhran-II test, India's nuclear power and strategic position reached a new height on the international stage. Although the test was controversial worldwide, India took a firm stand in pursuing its independent nuclear policy. It was a political and strategic achievement for India, which was very important for ensuring the country's sovereignty and security.

India's nuclear policy and strategy have evolved in the post-Pokharan II period. India has remained firm on its nuclear capability and security policy and has sought to continue a constructive dialogue on nuclear power in the international arena.

**Current Nuclear Policy:**

India's current nuclear policy is an important foundation for its defence, strategy and international relations. It is based on three main pillars: deterrence, strategic self-reliance and peaceful use of nuclear power. Through this policy, India has adopted a balanced approach to the use and development of nuclear power to ensure its security. Firstly, India follows the 'No First Use' (NFU) policy as one of the fundamental pillars of its nuclear policy. According to this policy, India will never use nuclear weapons first, but will only be able to use nuclear weapons for defensive purposes. This policy of India is considered an important step towards peacekeeping and deterrence. The NFU policy is an important part of India's defence strategy and is instrumental in establishing India's peaceful defence image in the world. However, this policy is under review, as it may reconsider its decision to use nuclear weapons if India's security situation becomes seriously compromised. Secondly, a key pillar of India's nuclear policy is strategic self-reliance. India builds all its nuclear weapons and delivery systems on indigenous technology. This is not only important for the development of India's defence capabilities, but also for ensuring strategic autonomy and national security. Indigenous technology and expertise have helped India reduce its foreign dependence on nuclear weapons and related technologies. Indian scientists and researchers have developed innovative solutions and advanced methods in the field of nuclear technology, which are important for the country's security and self-reliance.

Thirdly, an essential part of India's nuclear policy is the use of nuclear energy for peaceful purposes. India's nuclear policy supports the use of nuclear energy not only for defence or strategic interests, but also for peaceful purposes. India has long made the use of nuclear energy for peaceful purposes a policy commitment. This includes the use of nuclear energy in power generation, agriculture, medicine and industry. It is of utmost importance to India that nuclear power is used not only for defence but also for the scientific, medical and environmental advancement of the country. India's nuclear policy sends a balanced and acceptable message to the international community. In India's view, nuclear weapons should never be used for offensive or proliferative purposes, but can only be used as a means of defence and deterrence. India has expressed reservations about the steps taken by countries to implement the International Nuclear Non-Proliferation Treaty (NPT) and the Comprehensive Nuclear-Test-Ban Treaty (CTBT), as India believes that these treaties limit the exclusive dominance of nuclear-weapon states and impose restrictions on other states from developing nuclear weapons. In addition, India's nuclear policy may change from time to time depending on its

regional and global security situation. India, while formulating its policy, takes into account the activities and strategic positions of other nuclear-weapon states, while maintaining its commitment to world peace. India believes that nuclear power can only be used for self-defence and national security and for no other purpose.

India's nuclear policy is designed to ensure peaceful coexistence, self-reliance and strategic security. It ensures that India emerges as a strong and safe nuclear power and ensures the specific and controlled use of nuclear energy for defence purposes in addition to peaceful uses. India's nuclear policy has enhanced its status in the international community and established a strong strategic position in the Asian region.

**Current Capabilities**

India's current nuclear capabilities have further strengthened the country's defence system in line with the International Atomic Energy Agency (IAEA) norms and while maintaining strategic self-reliance. India currently possesses a wide range of nuclear weapons, which are effective in both strategic and tactical aspects. One of these is the Agni series of missiles, which is one of India's most powerful weapons. Various versions of the Agni missile, such as Agni-1, Agni-2, Agni-3 and Agni-4, enable India to deliver nuclear strikes anywhere in the world. While the peaceful purposes and humanitarian aspects of India's nuclear use have always been important, India's aim is also clear in developing its defence capabilities. India's nuclear policy is a continuous process towards sound military and strategic stability. From Smiling Buddha (1974) to Pokhran-II (1998), each nuclear test has strengthened India's strategic self-reliance and deterrence. The 1974 nuclear test, in which India declared that it wanted to use nuclear power for peaceful purposes, but was prepared to use it for defence purposes in the future, marked the beginning of international recognition of India's nuclear power.

In addition, work is underway to develop modern missile technology and nuclear submarines to expand India's nuclear capabilities. The upgrading of India's ADM (Agni) series and submarine fleets with missiles and nuclear capabilities is considered an important step towards ensuring strategic security. Through this modernization, India has now emerged as a strong and deterrent nuclear power, capable of dealing with any kind of attack or escalation. However, India's nuclear policy and capabilities have always been criticized internationally. In particular, India's relationship with the NPT (Non-Proliferation Treaty) and the CTBT (Comprehensive Nuclear-Test-Ban Treaty) has been controversial. India has never supported these treaties, as it believes that these treaties create discrimination between nuclear-weapon and non-nuclear-weapon states. India has said that the NPT and CTBT maintain international discrimination on

the issue of nuclear power rights, which can harm India's strategic autonomy and national security. In India's view, these treaties, while protecting the interests of non-nuclear-weapon states, increase the dominance of nuclear-weapon states, which is a major threat to the global security system.

India's nuclear policy has always been oriented towards strategic stability and peaceful use. Although the country is keen to use nuclear power for peaceful purposes, India has the ability to use it for defensive or self-defense purposes and the nuclear weapons capability is not only for offensive purposes, but also to strengthen the defense system and ensure the security of the country.

**Strategic Importance**

The main objective of this policy is to maintain peace and build trust among nuclear-weapon states. This approach of India has helped to maintain strategic stability among its neighbours. It shows that India is not an aggressor but believes in self-defense. However, this policy of India sends a strong message in defence strategy. It establishes India as a responsible nuclear power and enhances the country's status on the international stage. It has proven that India is a responsible nuclear-weapon state. This policy of India reduces competition among nuclear-weapon states and helps to maintain strategic stability in South Asia. Through this policy, India has proven that it is not in favor of increasing the nuclear arms race and that the use of weapons is acceptable only as a deterrent.

**Criticism**

However, the No First Use Policy has also been criticized at various times. Many experts believe that it creates a limitation in India's defence system. Because, if an enemy country uses nuclear weapons first, it may take time for India to take preventive measures. Moreover, the aggressive tactics of nuclear-armed neighbors like China and Pakistan may question the effectiveness of this policy.

**Potential for Change:**

The relevance of this policy has been debated in the current geopolitical context. Given China's growing military power and ongoing tensions with Pakistan, many believe that India needs to be somewhat flexible in its nuclear policy. However, the current Indian government is still committed to this policy and no formal initiative has been taken to change it. The No First Use Policy is an important aspect of India's nuclear policy and an integral part of its strategic philosophy. It reflects India's peaceful and responsible attitude. In the future, this policy may change based on the international situation and regional security challenges. However, the

strategy of peace and deterrence that India has adopted through this policy plays an important role in maintaining international relations and regional stability.

**Command and Control: Role of Strategic Forces Command and Nuclear Command Authority:**

The foundation of India's nuclear policy and strategic capabilities is its command and control structure. This structure plays a vital role in ensuring accountability in the use of nuclear weapons, as well as in safeguarding the country's sovereignty and implementing its defense strategy. At the heart of this structure in India are the Strategic Forces Command (SFC) and the Nuclear Command Authority (NCA). These two organizations serve as the focal points for the management, command and control of India's nuclear weapons. India's nuclear program has been managed responsibly and strategically since its inception. However, after the successful nuclear tests in 1998, it became imperative for India to develop an effective command and control structure. To create a specific framework for nuclear weapons management, India formed the Nuclear Command Authority in 2003 and brought the Strategic Forces Command under this structure. The Strategic Forces Command (SFC) is a specialized branch of the Indian military, which is responsible for the management and control of the country's nuclear weapons and related strategic systems. It works directly under the Nuclear Command Authority. The main role of the SFC is to manage the country's nuclear weapons, ensure their security, and ensure their use as planned, if necessary. Through the SFC, India has ensured that its nuclear weapons management and control are managed through a central structure. It ensures military accountability in nuclear weapons management and establishes a framework where decision-making is fast and effective.

The SFC primarily works in coordination with the three services - the Army, Navy, and Air Force. While each service has its own role and responsibilities, the SFC provides central guidance for their operations. As a result, India's nuclear weapons management has become more integrated and effective. The Nuclear Command Authority or NCA is the highest authority responsible for authorizing and managing the use of India's nuclear weapons. It is divided into two parts - a Political Council and an Executive Council. The Political Council is headed by the Prime Minister and has the final decision-making power. The Executive Council, which functions under the leadership of the National Security Advisor, mainly formulates strategic directions and plans. The structure of the NCA reflects India's nuclear policy. It ensures that the decision to use nuclear weapons will always be under the political leadership and will be used only for defensive purposes. This structure has established India as a

responsible nuclear power and enhanced its credibility in the international arena. The use of technology and strategic planning play a vital role in further strengthening India's nuclear command and control structure. Special emphasis has been given to state-of-the-art communication systems and cyber security to ensure rapid communication and decision-making between the SFC and the NCA. Ensuring security in the management of nuclear weapons is a major challenge. India's SFC and NCA are working tirelessly to meet this challenge. State-of-the-art technology and security protocols have been implemented to protect nuclear weapons and their associated components.

India's "No First Use" policy and defensive nuclear policy are clearly reflected in the operations of the SFC and NCA. This ensures that India's nuclear weapons management is always conducted strategically and responsibly. The SFC and NCA not only fulfill the responsibility of managing the country's nuclear weapons, but also serve as a symbol of India's commitment to maintaining international security and stability. India's nuclear command and control structure has further strengthened its responsible nuclear posture and commitment to international security.

**In conclusion**, India's Strategic Forces Command and Nuclear Command Authority are an important part of its nuclear weapons management. This structure is a reflection of India's nuclear policy and its commitment to international security. In the future, this command and control structure will further strengthen India's defense and strategic capabilities and further consolidate its position in the international arena.

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