India's Nuclear Policy Since 1998

Perspectives and Challenges

By

Rameez Raja

India's Nuclear Policy Since 1998: Perspectives and Challenges

By Rameez Raja

This book first published 2025

Ethics International Press Ltd, UK

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library

Print Book ISBN: 978-1-80441-692-1

eBook ISBN: 978-1-80441-693-8

to my daughter

Afiyah Rameez

Contents

List of Tables, Figures, and Maps

Tables

Figures

Map

Abbreviations

AA	Appellate Authority
ABM	Anti-Ballistic Missile
ABWR	Advanced Boiling Water Reactor
AEA	Atomic Energy Act
AEC	Atomic Energy Commission
AERB	Atomic Energy Regulatory Board
AERC	Atomic Energy Research Committee
APCLC	Andhra Pradesh Civil Liberties Committee
AVA	Anubam Virodhi Andolan
AVSS	Anu Virodhi Shanti Samiti
BARC	Bhabha Atomic Research Centre
BJP	Bharatiya Janata Party
BHET	Bharat Heavy Electricals Ltd
BMD	Ballistic Missile Defence
BMDS	Ballistic Missile Defence System
BOTAS	Bulletin of the Atomic Scientists
CAG	Comptroller and Auditor General
CARMS	Compact Aerial Radiation Monitoring System
CBM	Confidence Building Measures
CCS	Cabinet Committee on Security
CD	Conference on Disarmament
CFBR	Commercial Fast Breeder Reactor
CIA	Central Intelligence Agency
CIRUS	Canadian-India Reactor United States
CMD	Credible Minimum Deterrence

CNS	Council of National Safety
CTBT	Comprehensive Test Ban Treaty
CSD	Cold Start Doctrine
CSIR	Council of Scientific and Industrial Research
C31	Command, Control, Communication and Intelligence
DAE	Department of Atomic Energy
DGP	Delhi Policy Group
DRDO	Defence Research and Development Organization
DND	Draft Nuclear Doctrine
EAC	Expert Appraisal Committee
EIA	Environment Impact Assessment
ENDC	Eighteen Nations Disarmament Conference
EPR	European Pressurized Reactor
ERMNA	Environmental Radiation Monitoring with Navigational Aid
FBTR	Fast Breeder Test Reactor
FMCT	Fissile Material Cut-off Treaty
FSR	Fast Spectrum Reactor
GE	General Electric
GDP	Gross Domestic Product
GIC	General Insurance Company
GW	Gigawatt
GWOT	Global War on Terror
HCC	Hindustan Construction Co.
HEU	Highly Enriched Uranium
HWP	Heavy Water Plant
HWR	Heavy Water Reactor
IAEA	International Atomic Energy Agency

IAEC	Indian Atomic Energy Commission
IAF	Indian Air Force
IB	Intelligence Bureau
ICBM	Intercontinental Ballistic Missile
ICNS	International Convention on Nuclear Safety
ICRP	International Commission on Radiological Protection
IDSA	Institute for Defence Studies and Analyses
IGCAR	Indira Gandhi Centre for Atomic Research
IGMDP	Integrated Guided Missile Development Programme
IIT	Indian Institute of Technology
INR	Indian Rupee
INRMN	Indian Environmental Radiation Monitoring Network
ISI	Inter-Services Intelligence
JNPP	Jaitapur Nuclear Power Project
KAPS	Kakrapar Atomic Power Station
KKNPP	Kudankulam Nuclear Power Plant
KSU	Khasi Student Union
IMF	International Monitory Fund
LEU	Low Enriched Uranium
LNT	Linear No-Threshold
LWR	Light Water Reactor
MFBR	Metallic Fuelled Fast Breeder Reactor
MIRV	Multiple Independent Re-entry Vehicle
MoEF	Ministry for Environment and Forestry
MoU	Memorandum of Understanding
MTCR	Missile Technology Control Regime
MW	Megawatt
NATO	North Atlantic Treaty Organization

NCA	National Command Authority
NCBM	Nuclear Confidence Building Measures
NDMA	National Disaster Management Authority
NFU	No-First-Use
NNWS	Non-Nuclear Weapon States
NPC	Nuclear Power Corporation
NPCIL	Nuclear Power Corporation of India Limited
NRRM	Nuclear Risk Reduction Measures
NSA	Nuclear Security Assurance
NSG	Nuclear Supplier Group
NSS	Nuclear Security Summit
NTI	Nuclear Threat Initiative
NWD	Non-Weaponized Deterrence
NWS	Nuclear Weapon States
NPP	Nuclear Power Plants
NPT	Nuclear Non-Proliferation Treaty
NSRB	Nuclear Security Regulatory Board
PFBR	Prototype Fast Breeder Reactor
PHWR	Pressurized Heavy Water Reactor
PAL	Permissive Action Link
PMANE	People's Movement Against Nuclear Energy
PNE	Peaceful Nuclear Explosion
PSI	Proliferation Security initiative
PTBT	Partial Test Ban Treaty
PURNIMA	Plutonium Reactor for Neutron Investigations in Multiplying Assemblies
RDD	Radiological Dispersal Devices
RAPS	Rajasthan Atomic Power Station

RAW	Research and Analysis Wing
RSS	Rashtriya Swayamsevak Sangh
RTI	Right to Information
R&D	Research & Development
SARCOP	Safety Review Committee for Operating Plants
SFR	Sodium Cooled Fast Reactor
SNEP	Subterranean Nuclear Explosion Project
SRC	Safety Review Committee
TAPS	Tarapur Atomic Power Station
THWP	Talcher Heavy Water Plant
TIFR	Tata Institute of Fundamental Research
UCIL	Uranium Corporation of India Limited
UK	United Kingdom
UN	United Nations
UNGA	United Nations General Assembly
UNSC	United Nations Security Council
US	United States
USSR	United Soviet Socialist Republic
VVER	Vodo-Vodyanoi Energetichesky Reactor
WMD	Weapons of Mass Destruction
WNA	World Nuclear Association
ZERLINA	Zero Energy Reactor for Lattice Investigations and Neutron Assay

Acknowledgments

It is my pleasure to express my gratefulness to different individuals whose valuable contribution, kind cooperation, and support made it possible for me to complete this book.

First of all, I thank Allah, the Almighty, the most Gracious, the most Merciful. Secondly, I express my deep sense of gratitude to my Ph. D. supervisor Professor Dr. Farah Naaz, for her continuous help, guidance, encouragement, and inspiration in my work. Without her scholarly guidance and rich academic contribution, it would not have been possible for me to complete this work.

I acknowledge my debts to all the faculty members of the Department of Political Science, Jamia Millia Islamia (JMI) for providing me continuous encouragement and support while completing this study. I am also thankful to the clerical staff and staff working in the Departmental library, Zakir Hussain Library (JMI), ICWF library, Bhai Gurdas library, Guru Nanak Dev University, Amritsar for their timely co-operation. Besides, I am thankful to the Indian Council of Social Science Research (ICSSR) for my doctoral fellowship.

I am grateful to those eminent scholars particularly deterrence optimists and proliferation pessimists along with peace activists whose writings have helped me to explore more related areas of my work. My heartfelt appreciation goes to my community mentor Dr. Afzal Ashraf, who reviewed my study and provided much need academic help to explore the nuclear questions thoroughly. Also, I am appreciative to Mr. Rafiq Ahamd Beig for helping me to reach to the concerned people for deciding the doctoral study topic.

Thanks are also due to Prof. M. V. Ramana, a physicist, who helped me a lot to understand India's civilian nuclear programme. I am obliged to my dearest friends in JMI such as Dr. Zahid Hussain, Dr.

Saleeq Ahmad Dar, Dr. Bilal Ahmad Tantray, Dr. Hafida Begum, and Mr. Raakib Ahmad Dar for their timely support in this study.

Above all, I do not have the words to express my gratitude to my family members. My grandmother, late Saga Begum, my father, Gulam Mohammad Dar and my mother, Dilshada Begum supported me to complete this work. Credit also goes to my brother, Tawseef Mudasir and sister, Tabasum Gull for their motivation regarding my higher education. Proudly, Mrs. Masroora Akhter, my wife and Afiyah Rameez, my daughter will remain my ultimate backing. Their love, affection and emotional sustenance encouraged me to continue my study on nuclear issues.

Last, but not the least, I must especially thank my ideal and guide Hazrat Mirza Masroor Ahmad, who has been a beacon of hope in the times when there seemed none and offered all the positive guidance needed for the completion of this study.

Rameez Raja

Introduction

Nuclear energy was introduced by several physicists and scientists in the 1930s and 1940s in the West. For instance, Albert Einstein, Leo Szillard, Eugene Wigner, Edward Teller, Frederic Soddy, Ernest Rutherford, James Chadwick, Carl Anderson, Ernest Walton, John Cockcroft, Frederic-Juliot-Curie, Otto Hahn, Lise Meitner, and Fritz Strassmann helped the world learn about the nuclear energy that unfortunately resulted in the bombardment of Japan by the United States (US) in 1945. The world physicists in general and Indian-origin physicists in particular in the West collaborated in this new field. Homi Bhabha was among them, who later started nuclear research in India.

Following the US atomic bombings of Hiroshima and Nagasaki, the world learned about the enormous quantity of energy generated by nuclear explosions. Physicists and engineers, with the help of their governments, began nuclear research in both military and civilian applications. The US, the former Soviet Union, the United Kingdom (UK), France, and China were the first nuclear powers to successfully develop weapons, earning the titles of responsible or proclaimed nuclear states.

Jawaharlal Nehru, India's first Prime Minister, advocated for the development of science and industry in the country. Homi Bhabha advised Nehru after independence to begin nuclear research in India. Bhabha was successful in convincing both Nehru and the Tata Trust to support the new project. The Department of Atomic Energy (DAE) was later established to oversee India's nuclear policies. Nuclear reactors were built in India for civilian uses with foreign assistance, primarily from Canada, the US, and the UK. However, India's Prime Minister, Nehru, was aware of the dual application of nuclear energy.

Initially, Indian Prime Ministers were sceptical about nuclear security. Some Indian leaders, including Indira Gandhi, use it as a vote bank. However, she was unable to win elections with India's first nuclear explosion in 1974. Underdevelopment, poverty, and other social issues were major concerns, and people in India were less aware of nuclear energy. However, Indian nuclear speakers have a strong relationship to nuclear warheads, which are revered as symbols of power, status, pride, and security. Additionally, nuclear weapons have occasionally been utilized as a political tool. Furthermore, numerous politicians, including Atal Bihari Vajpayee, utilized nuclear weapons to rescue their political careers and reputations, resulting in the five nuclear explosions in May 1998.

Following India's five nuclear tests in May 1998, the international community reacted, imposing economic sanctions on the country for violating the prohibition on the use of nuclear reactors for military purposes. Pakistan responded to India's five nuclear tests by testing six nuclear devices. India claimed that the tests were security-related. Pakistan and China's nuclear assistance to Pakistan were cited as the primary factors. Since May 1998, India, Pakistan, and China have been engaged in an ongoing arms race for deterrence; nevertheless, the Kargil War between India and Pakistan in 1999 took place under the shadow of nuclear weapons. India's nuclear policy has experienced numerous modifications since 1998. Nuclear authorities displayed two nuclear doctrines in 1999 and 2003. The no-first-use policy and the minimal credible deterrence were implemented. However, the 2003 nuclear draft was offensive. The new doctrine refers to a nuclear strike to any chemical or biological attack against India. The second nuclear doctrine also includes huge retribution and intolerable harm, which refers to India's nuclear retaliation against civilian regions.

India's nuclear policy differs from that of other nuclear states. The three-tier nuclear programme is implemented, with uranium, plutonium, and thorium is used for civilian and military objectives. Nevertheless, India's nuclear reactors face several obstacles, the most

significant of which is a lack of nuclear fuel. To address its nuclear requirements, India partnered with many nuclear states, primarily the US, which resulted in the Indo-US civil nuclear agreement in 2005. India received a Nuclear Supplier Group (NSG) waiver for nuclear trade in 2008. Several states objected to the waiver because India is not a signatory to the Nuclear Non-Proliferation Treaty (NPT). Despite being outside the NPT, India was able to gain the trust of numerous states, which consented to send fuel to nuclear facilities in India. It also separated some nuclear plants from the military use to allow International Atomic Energy Agency's (IAEA) inspection. It is projected that India could have 470 gigawatts (GW) of nuclear generating capacity by 2050.[1]

Aside from the success or failure of nuclear deterrence, India has some radioactive and displacement challenges. Some villages near nuclear facilities were victims of nuclear radiation, but their claims were denied by the DAE. Several studies on India's nuclear sector have denounced it as a source of pollution and a significant threat to biodiversity. Several historians, anti-nuclear campaigners, and pessimists have opposed India's nuclear programme for a variety of reasons.

A Glimpse at Theoretical Issues

Various theories have emerged to explain India's nuclear journey, both civilian and military in nature.

Optimists and Pessimists

In general, the topic of nuclear weapons and its proliferation is best debated by deterrence optimists and proliferation pessimists globally. Realists, neo-realists, and deterrent theorists endorse the nuclear deterrence theory. Hans Morgenthau, Bernard Brodie, Harman Kahn, Kenneth Waltz, and John Mearsheimer are among the proponents of

[1] M. V. Ramana, *The Power of Promise: Examining Nuclear Energy in India* (New Delhi: Penguin, 2012), xvii.

this field. Some advocated for a small number of nuclear weapons as a deterrent, while others advocated for a large nuclear force. Indian-origin political scholars play an important role in this endeavour. For instance, Sumit Ganguly, an optimist, believes that nuclear weapons have helped India and Pakistan to avoid major wars. Similarly, Vipin Narang argues that a no-first-use policy is more effective in deterrence and advises India to adopt a first strike capability for nuclear deterrent.

However, some well-known political scientists argue against the deterrence theory for a variety of reasons. For example, Scott Sagan is concerned about risk-laden policies and organisational biases in India and Pakistan, which could lead to deterrence failure in South Asia. S. Paul Kapur contends that the US, rather than nuclear deterrence, was responsible for averting the crisis and hostilities between India and Pakistan. Achin Vanaik argues that India is balancing with China on the military front, which has an indirect impact on Pakistan and is a major source of concern. The nuclear arms race among China, India, and Pakistan may lead to catastrophe in the region. According to Saria Khan, there is instability in the South Asian region because nuclear weapons failed to resolve the conflict. If the crisis continues, there is no assurance of peace and stability in South Asia. Similarly, Timothy Hoyt contends that the ongoing Kashmir question has prevented nuclear weapons from bringing stability in South Asia.

Nuclear Myth Makers

The theory is associated with Peter R. Lavoy, who explains how the views and opinions of expert's influence policy-making particularly in the realm of the nuclear policy of a country.[2] In India, several influential persons guided India to become nuclear. For instance, Jawaharlal Nehru, Homi Bhabha, Indira Gandhi, A.P.J. Abdul Kalam, R. Chidambaram, Anil Kakodkar, K. Subrahmanyam, K. Santhanam,

[2] Hassan Abbas, *Pakistan's Nuclear Bomb: A Story of Defiance, Deterrence and Deviance* (New Delhi: Penguin Random House India, 2018), 13.

Mohan Guruswamy, Brajesh Mishra, and Atul Bihari Vajpayee. Similarly, Muneer Ahmad Khan, Zulfiqar Ali Bhutto, General Zia-ul Haq, Samar Mubarakmand, Dr. Raizuddin, Abdul Qadir Khan in Pakistan played a remarkable role in this regard.

Environmental Protection

Not only do studies on nuclear deterrence suggest a perilous future for South Asia, but various studies on India's civilian nuclear programme have been disputed by physicists and environmentalists on the grounds that nuclear energy poses significant harm to biodiversity. The primary goal of this approach is to conserve the valuable resources of common interest to all living creatures. In addition, numerous academic think tanks have argued that nuclear energy is more expensive than water and coal for electricity generation, using India as an example. M. V. Ramana, a well-known physicist, conducted research on India's nuclear industry and predicted a bleak future for the country. Ramana claims that India has violated international safety regulations and that the DAE has failed to enforce the rules it has established for itself. The DAE has weakened several nuclear issues in the name of development and security. The DAE's restrictive tools prevent the public from accessing nuclear information. There is no independent authority outside of the DAE to oversee India's nuclear policies.

Anti-nuclear movements are also prevalent in India. Villagers supported by NGOs and anti-nuclear activists demonstrated against the operation of nuclear power facilities in India. Villagers in India have been protesting for a long time, but the DAE is passionate about nuclear energy because it believes it would lead India to a prosperous and powerful state. Nuclear energy enjoys widespread support in terms of power, status, pride, and security. India's nuclear programme has faced significant hurdles, and there is a divergence of views within and outside India.

Existing Literature Addressing the Nuclear Trends in South Asia

India's nuclear policy is one of the most essential areas of world politics, and it became increasingly vital after 1974. Indian and foreign intellectuals have produced numerous books and articles about the subject. The review of accessible literature has aided the current research in comprehending the many challenges and concerns directly and indirectly related to India's nuclear policy.

Regarding nuclear deterrence, Vanaik[3] expressly asserts that India's 1998 nuclear tests were driven by prestige/status rather than threat. The Indian elite, largely middle-class individuals, voted for a nuclear bomb. The author explains the truth about nuclear deterrence and its drawbacks in the context of India and Pakistan. He describes the involvement of the US in preventing a nuclear war between India and Pakistan during the Kargil crisis in 1999 and Operation Parakram. The author assumes that the presence of nuclear weapons between hostile countries does not guarantee the absence of nuclear conflict or war. Similarly, Ganguly and Kapur[4] discuss both optimistic and pessimistic thoughts about nuclear weapons. Ganguly, an optimist, believes that nuclear weapons have stabilised relations between competing states, particularly India and Pakistan. Ganguly also claims that the nuclear deterrent prevented massive battles between two hostile states. Kapur, contrary to optimist beliefs, claims that the proliferation of nuclear weapons in South Asia has made the region more unstable. Author acknowledges that nuclear weapons can provide incentives for rational states to engage in very disruptive behaviour. Kapur exposes the fantasy of nuclear deterrence and the reality of the nuclear deterrent as admitted by Ganguly in the context of India and Pakistan.

---

[3] Achin Vanaik, *After the Bomb: Reflections on India's Nuclear Journey* (New Delhi: Orient Blackswan, 2015).

[4] Sumit Ganguly, & S. Paul Kapur, *India, Pakistan, and the Bomb: Debating Nuclear Stability in South Asia* (New Delhi: Penguin, 2010).

Bidwai and Vanaik[5] chronicle India and Pakistan's nuclear development in a unique way. Both writers claimed that South Asia is the most dangerous region in the globe. Pakistan's response to nuclear tests culminated as a result of India's nuclear tests. The Indian bomb is a Hindutva bomb, fully sponsored by the BJP and its predecessors. The writers argued that nuclear deterrence is nothing more than a psychological condition. Several authors study the nuclear question on humanitarian basis. For instance, Hoodbhoy[6] criticizes nuclear weapons and their manufacturers. The author explains the scientist's moral and societal responsibility to resist nuclear weapons around the world. The author openly concludes that disagreements between India and Pakistan have yet to be addressed due to a loss-and-gain game. The disagreements between India and Pakistan can be easily settled by eliminating the phrase "your loss my gain and my gain your loss". Thomas and Gupta[7] portray India's desire for power, as well as its reliance on nuclear weapons. The authors argue that India revered science, particularly nuclear research. Hindu militant nationalists had long dreamed of nuclear weapons, and Chinese nuclear testing that prompted India to go nuclear was not a single contributing factor. The authors believe that India's nuclear deterrence may be a necessary evil. The authors admit that if India signs the NPT and forces Pakistan to follow suit, India will win the conventional weapons race in South Asia.

Scholars linked stability/instability with nuclear weapons. Kapur[8] argues that the expansion of nuclear weapons in South Asia inevitably raised the possibility of nuclear conflict in the region. As terrorism operates in South Asia, there is a risk of nuclear mishaps as well as

---

[5] Praful Bidwai, & Achin Vanaik, *South Asia on a Short Fuse: Nuclear Politics and the Future of Global Disarmament* (New Delhi: Oxford University Press, 2001).

[6] Pervez Hoodbhoy, ed. *Confronting the Bomb: Pakistani and Indian Scientists Speak Out* (Karachi: Oxford University Press, 2013).

[7] Raju. G. C. Thomas, & A. Gupta, ed. *India's Nuclear Security* (New Delhi: Vistaar Publication, 2000).

[8] S. Paul Kapur, *Dangerous Deterrent: Nuclear Weapons Proliferation and Conflict in South Asia* (New Delhi: Oxford University Press, 2008).

nuclear proliferation. Kapur contends that nuclear weapons played a little impact in deterring Indian leaders from waging a full-fledged war against Pakistan during Operation Parakram. Both India and Pakistan are belligerent towards one other due to territorial issues such as the Kashmir conflict. To reduce the potential cost of nuclear proliferation, ongoing territorial disputes must be resolved. Equally, rationality factor is the most important question contested in South Asia thus Booth[9] examines the spread of nuclear weapons and the debate over rationality and fear of nuclear deterrence. His edited book illustrates how more nuclear weapons will be detrimental and hazardous. Booth critiques Waltz's deterrence theory, claiming that rather than spreading nuclear weapons for peace, more trust may be beneficial to stability. The trust relationship between Argentina and Brazil serves as an excellent example of how to avoid wars rather than using a nuclear deterrent. The author admits that there is enough historical evidence from the Cold War and South Asia to demonstrate that if nuclear weapons expand, risks would rise. Additionally, stability and nuclear weapons' question was studied by Saira Khan.[10] Her study explores India-Pakistan's acquisition of nuclear weapons and their failure to resolve the situation, particularly the Kashmir dispute. According to Khan, the absence of war and the presence of a crisis cannot validate stability. Stability implies the absence of war and crisis, but in the context of India-Pakistan, there is only instability with the presence of crisis. With both states acquiring nuclear weapons, war is no longer an option, but the crisis has erupted, indicating instability. Kashmir conflict has been highlighted by various scholars as the heart of the problem in South Asia. Sridharan's edited book[11] is a compilation of contributions from many scholars on the use of international relations theory to alter conflict in South Asia. In this edited book, a study titled *Nuclear Deterrence Thinking in Pakistan*,

[9] Ken Booth, ed. *Realism and World Politics* (Abingdon, Oxon: Routledge, 2011).
[10] Saira Khan, *Nuclear Weapons and Conflict Transformation: The Case of India-Pakistan* (Abingdon, Oxon: Routledge, 2009).
[11] E. Sridharan, ed. *International Relations Theory and South Asia* (New Delhi: Oxford University Press, 2007).

Rajesh Basrur contends that India and Pakistan have comparable conflicts in their understanding of nuclear weapons issues. Also, Basrur[12] argues that nuclear weapons work as a political weapon rather than a security measure between India and Pakistan. The author claims that the two hostile states should resolve the Kashmir conflict rather than establish a nuclear force for security. Basrur further claims that Kashmir is only a vehicle for strengthening Indo-Pakistani domestic politics. He contends that nuclear weapons are designed to serve as a symbol of power rather than to modify warfare.

Nuclear doctrines are also a pressing issue at the international area thus Narang[13] uses his Posture Optimization Theory and demonstrates that first-use-policy is more effective than no-first-use one for deterrence between competing powers. According to Narang, theorists have underestimated nuclear powers' postures. India and Pakistan have vague and provocative nuclear doctrines, which might easily lead to a nuclear omnicide between the two enemy powers.

India's nuclear journey is related to its power projection factor. According to Mearsheimer[14], acquiring nuclear weapons does not elevate a state to great power status. Nuclear weapons are simply military arms or a form of deterrent. He is skeptical of the success of nuclear deterrence between India and Pakistan because of their close borders. Also, the author claims that China is not hostile when compared to India and the US. Mearsheimer believes in a robust nuclear force to remove enemies. Apart from deterrence, to validate nuclear weapons as battlefield weapons, some scholars hinted to build missile defence systems. Kahn[15] is a strong advocate of nuclear deterrence. He explains how nuclear weapons might balance a power

---

[12] Rajesh M. Basrur, *South Asia's Cold War: Nuclear Weapons and Conflict in Comparative Perspective* (Abingdon, Oxon: Routledge, 2008).

[13] Vipin Narang, *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict* (Princeton: Princeton University Press, 2015).

[14] John Mearsheimer, *The Tragedy of Great Power Politics* (New York: W. W. Norton & Company, 2014).

[15] Herman Kahn, *Thinking about the Unthinkable in the 1980s* (New York: Simon and Schuster, 1984).

between two rival states. Furthermore, Kahn advocates for nuclear war if deterrence fails, using a missile defence system, shells, and evacuation plans. Interestingly, Kahn claims that nuclear war is not morally wrong. In contrast, Thakur [16] asserts unequivocally that if nuclear war is bad, threatening or planning for such a lethal war is equally unethical. According to the author, peace research, rather than strategic studies, is urgently required to resolve global conflicts.

At the civilian sector, India met several challenges. Several authors[17] disagree with the premise that nuclear physics is superior to other sciences. M. V. Ramana, in particular, contends that India should make nuclear knowledge available to the public, which has been restricted by Indian nuclear authorities. According to Ramana, India withheld information concerning nuclear waste with a radioactive influence for tens of thousands of years. Similarly, Ramana[18] envisions a bleak future for India as a result of the DAE's breach of international safety rules for nuclear plants. He argues that India's nuclear sector is a source of pollution and a significant threat to biodiversity. The author concludes that solar energy is a safer alternative to nuclear energy since it is less harmful to biodiversity as well as a cheap source of energy.

Certain Questions Need Answers

- What are the factors that have influenced India's nuclear policy?
- On what grounds India has rejected nuclear regimes such as NPT and CTBT?
- What are the reasons that prompted India to overtly go for nuclear weapons in 1998?
- Why is Indo-US nuclear deal important for India?

---

[16] Ramesh Thakur, *Nuclear Weapons and International Security: Collected Essays* (Abingdon, Oxon: Routledge, 2015).

[17] Itty Abraham, *South Asian Cultures of the Bomb: Atomic Publics and the State in India and Pakistan* (Bloomington & Indianapolis: Indiana University Press, 2009).

[18] Ramana, *The Power of Promise*.

- Why does India need nuclear weapons as these do not provide total security to the nuclear weapon states?
- Do nuclear weapons maintain a balance of power on a regional and global scale?
- How will India respond if it is attacked by nuclear weapon states like Pakistan and China?
- Do nuclear plants help India to provide cheap electricity to the public?
- How nuclear authorities are responding to the radiation and displacement issues in India?
- Does India implement all the international safety provisions?

Hypothesis

Exploring the nuclear literature, this study attempts to validate the following hypothesis. First, India's nuclear policy is more influenced by domestic, power, and status considerations than by security determinism; second, nuclear weapons rarely help India to become a great power; and third, India's nuclear sector contributes to pollution and poses a significant threat to biodiversity. The book investigates why India suddenly decided to obtain an open, weaponised nuclear deterrence after spending years on the other side of the nuclear threshold. It studies Pakistan and China's influence on Indian nuclear policy, as well as it observes India's nuclear cooperation with other countries and its global influence.

India's nuclear programme is remarkable for a developing country. It has implemented a three-tier nuclear system in which uranium, plutonium, and thorium are used for dual purposes. India has about 22 nuclear power facilities, both for military and civilian reasons. The DAE oversees several nuclear centres, labs, and institutes around India that are researching to assist India's nuclear development. Nuclear energy is expected to become an increasingly important component of India's energy security and sustainable development ambition.

Though, this book explores vast resources, censorship in India is a big challenge. Very less information regarding nuclear is disclosed to the public by the DAE. To substantiate my arguments various methods such as case study, analytical, comparative, and historical approach regarding India's nuclear question was used. Additionally, the approaches provided for this study are qualitative and exploratory. Primary and secondary sources of information have been utilized.

Overview of the Book

The book is divided into five chapters. The first chapter looks at the circumstances that drove India to become nuclear. The study recognizes that security was not the primary motivator for weapon procurement. In May 1998, Atal Bihari Vajpayee blasted the Pokhran desert in an attempt to rescue his political career and image. Nuclear weapons are also utilized to boost India's domestic politics. Furthermore, nuclear weapons are regarded as a source of strength, pride, and security in India.

The second chapter focuses on India, Pakistan, and China's nuclear doctrines. The study recognizes that the nuclear doctrines of all the three nuclear powers are ambiguous. Each states nuclear weapons policy, whether no-first-use or first-use is unclear. The study understands that India's nuclear doctrine is aggressive since it threatens a nuclear assault in response to any chemical or biological attack on India. All three states disagree with Kenneth Waltz's deterrence theory, which holds that a small number of nuclear warheads will suffice for secure deterrence. Both India and Pakistan are working to expand their nuclear arsenals and build a powerful nuclear force capable of annihilating one another. India is likewise attempting to match China's nuclear capabilities. In addition, a missile defence system is being developed to destroy incoming missiles from enemy states. The study comprehends that if unsolved conflicts among the three states are resolved, nuclear arsenals may be reduced. However, China is concerned about the powerful nuclear force of the US which has a direct impact on India's security.

The third chapter examines India and Pakistan's pre-nuclear and nuclear crises, as well as peace proposals. The unresolved Kashmir dispute has triggered additional problems. India's misrule in Kashmir has prompted Pakistan to destabilise Kashmir. India's infringement of state autonomy through 47 presidential orders culminated in the Kashmir crisis in the 1980s, prompting Pakistan to intervene and offer material and diplomatic support to Kashmiri militants. The participation of the US prevented the Brasstacks crisis, Kashmir crisis, Kargil war, and Operation Parakram, no evidence supported the employment of nuclear weapons to deter these crises. Pakistan invaded India motivated by its nuclear force, which resulted in the Kargil War in 1999. All of India and Pakistan's peace initiatives have been useless. Efforts to reduce nuclear risk and develop confidence-building measures proved futile because they were not implemented properly. The peace initiatives failed to address the Kashmir conflict, which lies at the heart of India's strong rivalry with Pakistan.

The fourth chapter examines India's nuclear relationship with other countries to advance its nuclear civilian programme. India has maintained a positive relationship with the nuclear supplier group. However, several states are unwilling to engage in nuclear trade with India. Despite being outside of the NPT, India received nuclear assistance from various states. The study recognizes that India needs fuel to run its nuclear reactors, which are dual-use. The nuclear enterprise can assist India to attain its civilian and military objectives.

The fifth chapter of the study examines the challenges to India's nuclear policy as well as recommendations from various perspectives. It identifies various issues, both civilian and military, which should be addressed swiftly. The most significant issue to India's nuclear policy is invalidation of nuclear weapons to deter Pakistan from destabilising Kashmir. Deterrence failure in South Asia may occur as a result of risky policies and organisational biases between India and Pakistan. Furthermore, India's nuclear industry has had a number of mishaps since its start.

Chapter I
India's Nuclear Policy: Background

In the pre-World War II era, the organisation of research in universities was carried out by a India's nuclear policy, which has always encompassed both continuity and change, has been developed and implemented by the nation's nuclear specialists. The construction of the required infrastructure and the operations of the scientific and technological establishment have been steady and have advanced noticeably over the decades.[19] The Bharatiya Janata Party (BJP) was elected to power following its victory in the February and March 1998 General Elections. This Hindu nationalist party pledged during the campaign and in its election manifesto to reevaluate the nuclear strategy if elected. The Strategic Review Committee was formed shortly after the Vajpayee/BJP government took office. In compliance with its recommendations, the committee conducted five nuclear tests between 11 May and 13 May 1998. On 11 May, India conducted tests of three different types of weapons: a thermonuclear bomb, a fission-type weapon, and a low-yield device. Two additional sub-kiloton tests were carried out on 13 May. The tests were successful, Prime Minister Vajpayee told the Indian parliament in a Suo Moto statement on 27 May. He also declared a moratorium on independent tests.[20] Vajpayee stated in a speech to the parliament that he believed nuclear weapons were "India's due, the right of one-sixth of humanity."[21] In reaction to the controversy surrounding the Pokhran II nuclear explosions, former Indian President A.P.J. Abdul Kalam said the tests were

---

[19] M. V. Ramana, "Scientists and India's Nuclear Bomb," in *Confronting the Bomb, Pakistani and Indian Scientists Speak Out*, ed. Pervez Hoodbhoy (Oxford University Press, 2013), 5.

[20] Bhumitra Chakma, "Toward Pokhran II: Explaining India's nuclearisation process", *Modern Asian Studies* 39, No. 1, (2005), 232-233.

[21] Smitu Kothari, and Zia Mian, ed. *Out of the Nuclear Shadow* (Lokayan and Rainbow Publishers, Delhi, 2001), 18.

successful and had yielded the desired result. He attested that between 11 May and 13 May 1998, India carried out five tests at the Pokhran range in Rajasthan.[22] One of the tests involved a 45-kiloton thermonuclear device, popularly known as a hydrogen bomb. A 15-kiloton fission device and a 0.2-kiloton "sub-kiloton device" were the subjects of additional tests on 11 May. The main participants in the Pokhran II tests were Anil Kakodkar, the then-Director of the BARC, Mr. Kalam, the Scientific Adviser to the Defence Minister, and R. Chidambaram, the Chairman of the Atomic Energy Commission (AEC).[23]

An important scientific and technological advance in modern society is nuclear energy. Therefore, it also raises the prospect of a new industrial revolution in India. The theoretical potential of atomic energy has been understood for at least thirty years prior to the first atomic bombs being detonated in Hiroshima and Nagasaki. Einstein's well-known "equivalence of mass and energy" formula, which states that matter has energy millions of times more than its weight, expresses this notion. It became more feasible with the discovery of uranium fission and the subsequent development of the method for sustaining a self-sustaining chain reaction. James S. Allen wrote about the potential of atomic energy in 1949.

> In economically backward areas, now on the verge of industrialization because of the rise of the colonial freedom movements, atomics has also great potentials. In an absolute sense, cheap and flexible power is indispensable throughout the colonial and semi-colonial world, and in Latin America, Asia, and Africa, if the peoples of these regions are to achieve better livelihood and genuine freedom.[24]

---

[22] "Pokhran -II Tests were successful: Kalam," *The Hindu*, August 28, 2009.

[23] Ibid.

[24] K. K. Pathak, *Nuclear Policy of India* (New Delhi: Gitanjali Prakashan, 1980), 1-2.

Harison Brown (American nuclear expert) wrote in the introduction to the Report on Regional Economic Development of Nuclear Power in India:

> It seems clear that India's ultimate energy resources are insufficient to permit it to negotiate successfully the industrial transition. This means that if India is to succeed from its plans for development it must eventually shift from a dependence upon coal, petroleum and water power as resources of energy to a dependence upon nuclear energy.[25]

Jawaharlal Nehru Years (1947-1964)

Ashok Kapur said that the Nehru-Bhabha era saw the establishment of three interrelated strands that make up India's nuclear policy. The first, referred to as the 'diplomatic' thread, was developed and delineated in 1947. But later on, Indian views and policies on other defence and international policy issues, such as the Kashmir policy, relations with Pakistan, the US, and the former Soviet Union, as well as defence requirements, began to take shape.[26] Scientific and technological activity can be defined as the second component of India's nuclear policy, while the integration of these two components in nuclear matters is the third. The first and second parts talk about India's efforts to use nuclear diplomacy to interact with the world community and its dedication to improving its scientific capabilities in the field of nuclear energy.[27]

---

[25] Ibid, 2.

[26] Ashok Kapur, *Pokhran and Beyond: India's Nuclear Behaviour* (Oxford University Press, 2001), 45.

[27] Ibid, 46, 48.

1: Pattern of Indian Nuclear Technical Indigenization

Activity	Year	Weapons Capability	Safeguards Status	Foreign Collaborator
Policy position to go nuclear if compelled was announced by Nehru.	1946-48	Nil	Nil	Nil
Indian atomic energy research committee was established	1946	Nil	Nil	Nil
Atomic energy cooperation with foreign governments was established.	1955 onwards	Nil	Nil	Canada, US, UK, France
Research reactor APSARA, -light, water, medium enriched uranium, went critical. (This was the first research reactor in Asia.)	1956	Potential	Nil	UK
Fuel fabrication uranium metal plant produced nuclear-grade uranium.	1959	Potential	Nil	Nil
CIRUS research reactor heavy water, natural uranium, was critical	1960	Yes	Nil	Canada, US governments*

Activity	Year	Weapons Capability	Safeguards Status	Foreign Collaborator
Zerlina-heavy water, variable fuel, went critical.	1961	Nil	Nil	Nil
Heavy water production started.	1962	Nil	Nil	West German company
Plutonium was separated at Trombay	1965	Yes	Nil	Nil

*Canada supplied the research reactor and the heavy water. The US too sub-sequently provided heavy water.

Source: Ashok Kapur, *Pokhran and Beyond: India's Nuclear Behaviour* (Oxford University Press, 2001), 51.

The pre-existing organisation in India prior to independence made nuclear energy development possible. The scientific community has benefited greatly from the contributions of Indian universities. The most influential university in this area was Calcutta University, which was founded thanks to its distinguished vice-chancellor, Sir Asutosh Mukherjee.[28] The accomplishments of Raman, Saha, and others may be publicly displayed in the nation, because to his extraordinary organisational skills. At that time, there were not many research institutes in India.

Prior to World War II, a group of scientists including Bhabha and Dr. S. S. Bhatnagar carried out the organisation of research in universities. A network of national laboratories with expertise in several natural scientific domains was the aim of Dr. Bhatnagar during this time. At the same time, Bhabha was designing a top-notch nuclear research institute in Bombay. In 1944, he wrote a famous letter to the then-

[28] T. T. Poulose, *Perspective of India's Nuclear Policy* (New Delhi: Young Asia, 1978), 1.