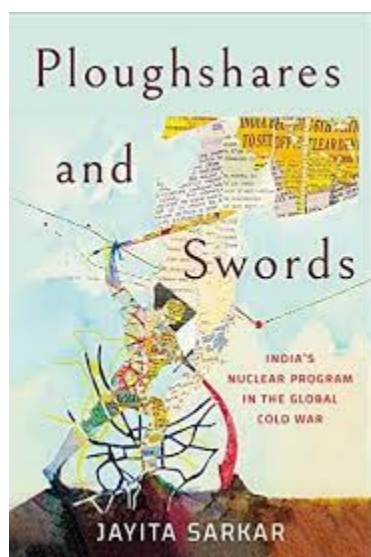


Book Review: Ploughshares and Swords: India's Nuclear Program in the Global Cold War by Jayita Sarkar

In Ploughshares and Swords: India's Nuclear Program in the Global Cold War – available [open access](#) – Jayita Sarkar explores the global story of India's nuclear programme during its first 40 years, set within the context of the Cold War. Drawing on extensive interdisciplinary research, this book is a useful addition to the literature on India's nuclear programme and powerfully underscores the importance of its subject matter, writes M.V. Ramana.

Ploughshares and Swords: India's Nuclear Program in the Global Cold War. Jayita Sarkar. Cornell University Press. 2022.



Ever since the May 1998 nuclear weapon tests conducted by India, and followed by Pakistan, there has been a stream of books and articles that delve into the history of the nuclear programmes of the two South Asian countries. Possessing a larger and older nuclear programme, India has come in for more attention. Of special importance are books by scholars [Itty Abraham](#), [Robert Anderson](#), [George Perkovich](#), and [Jahnvi Phalkey](#).

Jayita Sarkar's [*Ploughshares and Swords*](#) follows in this tradition to dive deeper into the same saga, placing this history within the larger context of the Cold War. The book makes two key points: firstly, India's nuclear programme was a result of close collaboration, knowledge assimilation and technological imports from many countries, chiefly France, the US, the UK and the Soviet Union. Secondly, India's nuclear programme was 'a dual-use endeavour, simultaneously serving civilian and military ends' (7-8). Sarkar also offers a third argument about the space programme, but, in my opinion, it is less central to the book.

Both of these main points should be fairly uncontroversial. But they might not be, especially to those who have believed the propaganda offered by India's official establishment about its entirely indigenous and independent technological capabilities or by the global nuclear industry about a clear distinction between civilian nuclear energy and nuclear weapons production. (Just for emphasis: there isn't a clear distinction. Building the infrastructure for generating nuclear energy will take a country part of the way toward making nuclear weapons. Whether a country does so or not is largely a matter of choice, not capacity.) These arguments are particularly important today as advocates of nuclear power make historically flawed arguments about the technology, and play up its supposed ability to solve the grave threat of climate change.



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Ploughshares and Swords is chronological in its organisation, starting with the 1940s and the global interest in rare earths, specifically in the monazite sands found in the kingdom of Travancore, before its accession to India. After recounting the institutional birth of India's nuclear programme, Sarkar describes the close cooperation between France and India's atomic energy institutions, and India's leadership playing off the US and the Communist bloc.

The next section opens with [US President Dwight Eisenhower's 'Atoms for Peace' speech](#) that inaugurated a global nuclear marketplace, going on to describe how India's Department of Atomic Energy (DAE) signed agreements with the UK and Canada for its first two reactors, Apsara and [CIRUS](#).

Most critical to India's nascent interest in nuclear weapons was the 1959 purchase of the designs for a reprocessing plant from the US Vitro Corporation. This plant was to

[separate plutonium](#) from the other radioactive and undesirable elements in the spent fuel that would be forthcoming from the yet-to-be constructed CIRUS reactor, plutonium that would be first used to make the nuclear device exploded in May 1974. Among the important steps toward that explosion, Sarkar describes in some detail how the DAE obtained the design of a fast neutron reactor called PURNIMA which was built on the basis of the design of the Soviet Union's IBR-30 reactor. That reactor was to allow DAE physicists to figure out the behaviour of neutrons in the core of a nuclear weapon in the early stages of its explosion.

The third section of the book is set in the 1970s when India's Prime Minister Indira Gandhi ordered the first nuclear test, and the narrative alternates between domestic developments and the foreign policy and regional security environment. For the latter, in addition to describing the overall architecture of the global system of nation states that was being fractured on many fronts, Sarkar focuses on the events that led to the partition of Pakistan and Bangladesh becoming a separate nation state, and India's annexation of Sikkim.

Ploughshares and Swords, simply by virtue of being written much later, recounts a familiar story. But in each of these sections, it offers new archival evidence, assembled from collections housed in eight countries. Some of these nuggets are indeed very interesting. I will offer one teaser here. In June 1974, during a meeting with the secretary general of the French Ministry of Foreign Affairs, the Indian ambassador to France apparently claimed that the Indian government had been 'ready for an underground nuclear explosion since 1967' but delayed it 'owing to circumstances' (122). If true, this would change our understanding of when India acquired the technical capacity to design a nuclear weapon.

I will add that I find this quite implausible for a couple of reasons. First, as Sarkar writes a few pages later (126-28), before designing the explosive device, DAE physicists needed to experiment with the PURNIMA reactor, which was approved only in late 1968. Second, Ashok Parthasarathi revealed in [his 2007 autobiographical account](#) of his years as Prime Minister Indira Gandhi's science and technology adviser that the first reprocessing plant 'failed to work properly for almost seven years after formal commissioning. The chief problem was the separation of plutonium from the fission products. The concentration of the latter in the final product continued to be too high for the material to be handled and used for any purpose' (17).

There are a couple of places in the book where the author — a historian by training — might have benefitted from having her manuscript whetted by someone more knowledgeable about nuclear science and technology. One example is the description of the US interest in selling a Light Water Reactor ‘because it did not produce plutonium’ (81). Doubtlessly, Sarkar is accurately summarising some official document, but this is technically just wrong. Light Water Reactors, too, produce plutonium, and this plutonium is usable in nuclear weapons, even if it might be, for technical reasons, less desirable when compared to plutonium from a reactor like CIRUS that operates with natural uranium.

Minor quibbles aside, *Ploughshares and Swords* is a useful addition to the literature on India’s nuclear weapon/energy programme. Based on extensive research, the book brings together scholarship from diverse disciplines. Sarkar subtly emphasises the importance of understanding the subject of this research through a brief but powerful epilogue. Sarkar highlights how India’s nuclear programme has become an ‘anti-dissent machine’, acting as a ‘disciplining device of the state’ and unleashing violence against citizens who have agitated against nuclear power plants, thus sustaining ‘an antidemocratic culture in the largest democracy in the world’ (202-204). To quote from *The End of Imagination*, [novelist Arundhati Roy’s moving essay written after the 1998 nuclear test](#), the ‘nuclear bomb is the most anti-democratic, anti-national, anti-human, outright evil thing that man has ever made’.

Note: This review gives the views of the author, and not the position of the LSE Review of Books blog, or of the London School of Economics and Political Science.
