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Yogesh Joshi, Frank O'Donnell. *India and Nuclear Asia: Forces, Doctrine, and Dangers.* Washington, DC: Georgetown University Press, 2018. 240 pp. \$36.95 (paper), ISBN 978-1-62616-617-2.

Reviewed by Dinshaw Mistry (University of Cincinnati)

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Commissioned by Seth Offenbach (Bronx Community College, The City University of New York)

India and Nuclear Asia: Forces, Doctrine, and Danger discusses India's nuclear forces and doctrine and the risks of a regional conflict. The co-authors are postdoctoral fellows specializing in regional security and nuclear affairs. Yogesh Joshi (PhD, Jawaharlal Nehru University) is with the Center for International Security and Cooperation, Stanford University, while Frank O'Donnell (PhD, King's College), who was until recently at Harvard University's Belfer Center for Science and International Affairs, is currently at the US Naval War College.

The book's six chapters cover India's nuclear force structure; Pakistan's nuclear policies and their implications for India; China's nuclear policies and their implications for India; issues related to deterrence and doctrine; and India's approach to nonproliferation and to nuclear treaties. The book notes that new directions in India's nuclear posture and doctrine include the potential revisiting of India's no-first-use policy, the potential for multiple warheads on some Indian nuclear missiles, and the potential arming of cruise missiles with nuclear warheads. The authors mention that Pakistan is moving to a full spectrum of deterrence, with nuclear forces for every rung of conflict with India, and this significantly lowers the nuclear threshold (which is the threshold for using nuclear weapons in a conflict). They add that China is fielding a new generation of more precise multiwarhead missiles as well as more mobile ground forces. These changes in posture in India, Pakistan, and China; misperceptions in the three countries about nuclear doctrinal debates in their rivals; aggressive supporting trends in strategic thought about the applications of new nuclear and conventional hardware; and the absence of a trilateral

dialogue to reduce misperceptions all increase the potential for crisis escalation in any skirmish between India, Pakistan, and China. The authors recommend strategic dialogues among the three countries to discern their nuclear and territorial intentions and to reduce the risks of conflict arising from misperception. They also recommend an official public Indian defense review.

While the chapters cover mostly familiar terrain within the field of Indian nuclear policy, such as chapter 4 which focuses on the historical background of nuclear deterrence in Indian strategic thought, the book also contains some useful analysis and insights. For example, chapter 1 discusses India's nuclear triad but also highlights its limitations. It notes that India's nuclear-armed submarine, which completed its first operational patrol in 2018, is better conceptualized as a technology demonstrator given the limited 700-kilometer (km) range of its K15 missiles. India will only have a more capable submarine-based deterrent when it fields the 5,000-km range K5 missile, but this will have to await a larger redesigned submarine to accommodate the K5.

On Pakistan (chapter 2), the authors observe that its longest-range missile, the 2,700-km range Shaheen-3, can strike India's distant Andaman Islands, thereby eroding any advantage India could have gained by moving its nuclear systems off the mainland to these islands. Pakistan's cruise missiles would give it more options to counter Indian missile defenses. And naval nuclear forces are important to Pakistan, but it has yet to develop submarine-launched ballistic missiles.

On China (chapter 3), the authors mention that Bei-

China is concerned about a) India's 5,000-km range Agni-5 missile that can cover China's major cities from any launch point in India; b) India's nuclear-armed submarine; c) the prospect for India to expand fissile material stockpiles; and d) potential close military cooperation between India and the United States. These issues could compel a revision of Chinese nuclear approaches to India. However, as noted in the authors' own analysis in chapter 1, India's submarine fleet has limitations.

On nuclear doctrines (chapter 5), the book offers useful perspectives on India's 2003 nuclear doctrine, which was developed after the 2002 military crisis with Pakistan (when both countries mobilized several hundred thousand troops and were on the brink of war). The 2003 doctrine qualified India's no-first-use policy by keeping open the option to use nuclear weapons in response to a chemical or biological weapons attack. Further, compared to India's 1999 draft nuclear doctrine mentioning "punitive" retaliation, the 2003 doctrine was more muscular because it allowed for "massive" retaliation that inflicts "unacceptable punishment" in response to a nuclear strike. Also, the 2003 doctrine emphasized the term "credible" deterrent, which points to a larger arsenal than that required for a "minimum" deterrent.[1]

India's doctrinal debate now centers on two issues: the no-first-use policy and the meaning of "massive" retaliation. Domestic critics argue that Indian no-first-use policy constrains its options against Pakistan. Still, proponents note that ending a no-first-use policy would damage India's international reputation as a responsible nuclear power. As for "massive" retaliation, the authors criticize this approach because of its credibility problem—India would likely not retaliate massively in a situation where Pakistan uses a small number of tactical nuclear weapons against Indian military forces—and because it does not conform to principles of proportionality in the use of force (p. 154).

Finally, the book has a good analysis of the Comprehensive Test Ban Treaty (CTBT) and a possible Fissile Material Cutoff Treaty (FMCT). On the CTBT, it cites experts who argue that India's 1998 test of its thermonuclear device was only partly successful: "there is a unanimous agreement outside the AEC-DRDO [Atomic Energy Commission-Defense Research and Development Organization] circles that India will not be able to build safe and reliable two-stage fusion weapons ... since the [1998] fusion stage of the test was only a partial success" (p. 178). Thus, if India signs the CTBT, then it will be restricted to having confidence in just boosted fission

weapons but not in two-stage thermonuclear weapons. Such doubts would "compel India to address the question of what it would technically consider massive retaliation as mandated by its nuclear doctrine" (p. 178).

On the FMCT, the authors link this with India's deterrence posture by asking "how much fissile material would be needed for a credible deterrent posture" (p. 179). They clarify that while minimalists in India would be satisfied with one hundred nuclear weapons, maximalists have called for four hundred. They then observe that if India fields submarine-based nuclear forces (here, six submarines with sixteen missiles each would require one hundred warheads), ends its no-first-use policy, and opts for flexible response, these developments would require a larger nuclear arsenal and will therefore influence India's decision on the FMCT.

Drawing from the book's title of "forces, doctrine, and dangers," political scientists could infer that the dependent variable is "dangers" associated with the independent variables of forces and doctrines. The book itself discusses "dangers" in terms of crisis escalation. Still, the book does not look for variation in the dependent variable. Additionally, political scientists who would want the authors to tie these discussions with the voluminous literature on proliferation optimism and proliferation pessimism would be disappointed because the book does not directly engage this literature. Still, readers may infer that, because it calls attention to looming dangers associated with changes in nuclear doctrines and forces, it leans toward a pessimist argument over the long term.

Technologists will look at whether India has the capabilities to develop the force structures mentioned in the book. As per the standard technical literature, India has a limited stock of weapons-grade plutonium, enough for about 150 nuclear weapons, growing at the relatively small rate of five weapons annually (this could increase to ten if a second heavy-water reactor becomes operational).[2] India has a larger stock of reactor-grade plutonium, sufficient for several hundred nuclear weapons. However, if this material is used as fuel for India's breeder reactors, then it will not be available for weapons. The status of India's breeder program is unclear, because it is years behind schedule. In short, India's present plutonium inventory may be used entirely on land-based ballistic missiles, sea-based ballistic missiles, and air-delivered bombs, leaving little material to arm cruise missiles with nuclear weapons, which was a concern raised in the book.

Overall, *India and Nuclear Asia* covers familiar and

new ground on the topic of Indian nuclear strategy. It rightly recommends strategic dialogues among India, Pakistan, and China to reduce the risks of crisis escalation. Such dialogues, covering the full spectrum of issues related to crisis stability and arms race stability, are essential to reducing nuclear dangers in South Asia.

Notes

[1]. For the 1999 draft doctrine, see the website of India's Ministry of External Affairs, <https://mea.gov.in/in-focus-article.htm?18916/Draft+Report+of+National+Security+Advisory+Board+on+Indian+Nuclear+>

Doctrine. For the 2003 doctrine, see https://mea.gov.in/press-releases.htm?dt1/20131/The_Cabinet_Committee_on_Security_Reviews_perationalization_of_Indias_Nuclear_Doctrine+Report+of+National+Security+Advisory+Board+on+Indian+Nuclear+Doctrine.

[2]. Hans M. Kristensen and Matt Korda, "Indian Nuclear Forces, 2018," *Bulletin of the Atomic Scientists*, November 1, 2018, <https://thebulletin.org/2018/11/indian-nuclear-forces-2018/>.

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