GLASS HOUSES: Iran’s Nuclear Vulnerabilities

“If one day, the Islamic world is also equipped with weapons like those that Israel possesses now, then the strategy of global arrogance will reach a standstill because the use of even one nuclear bomb inside Israel will destroy everything. However, it will only harm the Islamic world. It is not irrational to contemplate such an eventuality.”

- FORMER IRANIAN PRESIDENT ALI AKBAR HASHEMI RAFSANJANI, DECEMBER 14, 2001

THE PUBLIC DEBATE in Iran about its nuclear program is highly circumscribed, focusing mainly on its nuclear “rights” and the proclaimed benefits of nuclear energy and technology. Almost nothing is said about the potential dangers that it poses to Iran. So perhaps it is not surprising that polls show between one-third and one-half of Iranians as favoring nuclear weapons development. But Iran’s efforts to become a nuclear threshold state could set off a nuclear arms race in an already unstable neighborhood. Nuclear deterrence in a proliferated region characterized by short missile flight times and deep-seated mutual suspicions would be an inherently uncertain proposition. Irrespective rhetoric, including frequent threats by Iran to destroy Israel, could increase the chances of a miscalculation during a crisis or war that leads to the use of nuclear weapons—with catastrophic consequences for Iran:

- A single 1-megaton (MT) weapon detonated over Tehran would kill or severely injure millions of residents through blast, heat, and radiation. In a nuclear war, Tehran would presumably be targeted by multiple devices, ensuring close to a 100% fatality rate.

A nuclear strike on Tehran would have a devastating impact on the entire country. Some 16% of all Iranians live in the greater Tehran area, which includes more than 50% of Iran’s industry, 30% of Iran’s public sector workforce, and most of its higher education institutions (50 colleges and universities). In a flash, millions of people, the central government, and much of the country’s economic capacity would be wiped out.

Tehran is a nearly ideal nuclear target, due to its compact pattern of settlement (a characteristic shared by nearly all of Iran’s cities) and the fact that the mountains that bound the city on several sides act as natural reflectors—thereby intensifying the effect of a nuclear blast.

*A 1-MT device (equal to 1 million tons of TNT) is roughly equivalent in yield to missile-delivered weapons used by several of the original nuclear weapons states. In comparison, the Hiroshima bomb was a 16-kiloton device (equal to 16,000 tons of TNT), while the largest ever created was a 50 MT device tested by the Soviet Union in 1961 (equal to 50 million tons of TNT).

A recent study by researchers associated with the Institute for Disasters Management at the University of Georgia simulated the consequences of a nuclear war between Iran and Israel using weapons effects and fallout prediction software developed by the U.S. Department of Defense. The study assumed that an Israeli strike, of various yields (15-500 kt) against Iran’s 18 largest cities, including Tehran, Mashhad, Esfahan, Karaj, Tabriz, and Shiraz. It assumed that a number of larger cities, including Tehran, would be subjected to multiple strikes. It predicted extremely high numbers of fatalities due to the compact pattern of settlement characteristics of Iranian cities, poor building construction standards, and inability of Iran’s healthcare system to handle massive numbers of burn, trauma, and radiation patients—many of whom would die due to inadequate care. Casualties estimates exceeded 20 million dead (including nearly all the residents of Tehran) and 2 million injured. A more extensive Israeli strike would result in correspondingly greater casualties. In either case, the consequences for Iran would be devastating.

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