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India Is Building a Top-Secret Nuclear City to Produce Thermonuclear Weapons, Experts Say

The weapons could upgrade India as a nuclear power — and deeply unsettle Pakistan and China.

By Adrian Levy December 16, 2015

CHALLAKERE, India — When laborers began excavating pastureland in India's southern Karnataka state early in 2012, members of the nomadic Lambani tribe were startled. For centuries, the scarlet-robed herbalists and herders had freely crisscrossed the undulating meadows there, known as *kavals*, and this uprooting of their landscape came without warning or explanation. By autumn, Puttaranga Setty, a wiry groundnut farmer from the village of Kallalli, encountered a barbed-wire fence blocking off a well-used trail. His neighbor, a herder, discovered that the road from this city to a nearby village had been diverted elsewhere. They rang Doddaullarti Karianna, a weaver who sits on one of the village councils that funnel India's sprawling democracy of 1.25 billion down to the grassroots.

Karianna asked officials with India's state and central governments why the land inhabited by farming and tribal communities was being walled off, but they refused to answer. So Karianna sought legal help from the Environment Support Group, a combative ecological advocacy organization that specializes in fighting illegal encroachment on greenbelt land. But the group also made little progress. Officials warned its lawyers that the prime minister's office was running the project. "There is no point fighting this, we were told," Leo Saldanha, a founding member of the advocacy organization, recalled. "You cannot win."

Only after construction on the site began that year did it finally become clear to the tribesmen and others that two secretive agencies were behind a project that experts say will be the subcontinent's largest military-run complex of nuclear centrifuges, atomic-research laboratories, and weapons- and aircraft-testing facilities when it's completed, probably sometime in 2017. Among the project's aims: to expand the government's nuclear research, to produce fuel for India's nuclear reactors, and to help power the country's fleet of new submarines.

But another, more controversial ambition, according to retired Indian government officials and independent experts in London and Washington, is to give India an extra stockpile of enriched uranium fuel that could be used in new hydrogen bombs, also known as thermonuclear weapons, substantially increasing the explosive force of those in its existing nuclear arsenal.

India's close neighbors, China and Pakistan, would see this move as a provocation: Experts say they might respond by ratcheting up their own nuclear firepower. Pakistan, in particular, considers itself a military rival, having engaged in four major conflicts with India, as well as frequent border skirmishes.

New Delhi has never published a detailed account of its nuclear arsenal, which it first developed in 1974, and there has been little public notice outside India about the construction at Challakere and its strategic implications. The government has said little about it and made no public promises about how the highly enriched uranium to be produced there will be used. As a military facility, it is not open to international inspection.

But a lengthy investigation by the Center for Public Integrity (CPI), including interviews with local residents, senior and retired Indian scientists and military officers connected to the nuclear program, and foreign experts and intelligence analysts, has pierced some of the secrecy surrounding the new facility, parts of which are slated to open in 2016. This new facility will give India a nuclear capability — the ability to make many large-yield nuclear arms — that most experts say it presently lacks.

A nuclear stockpile in a dangerous neighborhood

The independent Stockholm International Peace Research Institute (SIPRI) estimates that India already possesses between 90 and 110 nuclear weapons, as compared to Pakistan's estimated stockpile of up to 120. China, which borders India to the north, has approximately 260 warheads.

China successfully tested a thermonuclear weapon — involving a two-stage explosion, typically producing a much larger force and far greater destruction than single-stage atomic bombs — in 1967, while India's scientists claimed to have detonated a thermonuclear weapon in 1998. But the test site preparations director at the time, K. Santhanam, said in 2009 it was a "fizzle," rendering the number, type, and capability of such weapons in India's arsenal uncertain to outsiders.

India, according to former Australian nonproliferation chief John Carlson, is one of just three countries that continue to produce fissile materials for nuclear weapons — the others are Pakistan and North Korea. The enlargement of India's thermonuclear program would position the country alongside the United Kingdom, the United States, Russia, Israel, France, and China, which already have significant stockpiles of such weapons.

Few authorities in India are willing to discuss these matters publicly, partly because the country's Atomic Energy Act and the Official Secrets Act shroud everything connected to the Indian nuclear program and in the past have been used to bludgeon those who divulge details. Spokesmen for the two organizations involved in the Challakere construction, the Defense Research and Development Organisation (DRDO) and the Bhabha Atomic Research Centre (BARC), which has played a leading role in nuclear weapons design, declined to answer any of CPI's questions, including about the government's ambitions for the new park. The Indian Ministry of External Affairs also declined to comment.

The secret city emerges

Western analysts, speaking on condition of anonymity, say, however, that preparation for this enrichment effort has been underway for four years, at a second top-secret site known as the Rare Materials Plant, 160 miles to the south of Challakere, near the city of Mysore.

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Satellite photos of that facility from 2014 have revealed the existence of a new nuclear enrichment complex that is already feeding India's weapons program and, some Western analysts maintain, laying the groundwork for a more ambitious hydrogen bomb project. It is effectively a test bed for Challakere, they say, a proving ground for technology and a place where technicians can practice producing the highly enriched uranium the military would need.

The Ministry of Environment, Forest, and Climate Change approved the Mysore site's construction in October 2012 as "a project of strategic importance" that would cost nearly $100 million, according to a letter marked "secret," from the ministry to atomic energy officials that month. Seen by CPI, this letter spells out the ambition to feed new centrifuges with fuel derived from yellowcake — milled uranium ore named after its color — shipped from mines in the village of Jadugoda in India's north, 1,200 miles away from the Rare Materials Plant, and to draw water from the nearby Krishna Raja Sagar dam.

Finding authoritative information about the scope and objectives of these two massive construction projects is not easy. "Even for us, details of the Indian program are always sketchy, and hard facts thin on the ground," a circumstance that leaves room for misunderstanding, a senior Obama administration official said in Washington.

But Gary Samore, who served from 2009 to 2013 as the White House coordinator for arms control and weapons of mass destruction, said there was little misunderstanding. "I believe that India intends to build thermonuclear weapons as part of its strategic deterrent against China," said Samore. It is unclear, he continued, when India will realize this goal of a larger and more powerful arsenal, but "they will."

A former senior British official who worked on nuclear issues likewise said intelligence analysts on both sides of the Atlantic are "increasingly concerned" about India's pursuit of thermonuclear weapons and are "actively monitoring" both sites. U.S. officials in Washington said they shared this assessment. "Mysore is being constantly monitored, and we are constantly monitoring progress in Challakere," a former White House official said.

Robert Kelley, who served as the director of the Iraq Action Team at the International Atomic Energy Agency (IAEA) from 1992-1993 and 2001-2005, is a former project leader for nuclear intelligence at the Los Alamos National Laboratory. He told CPI that after analyzing the available satellite imagery, as well as studying open source material on both sites, he believes that India is pursuing a larger thermonuclear arsenal. Its development, he warned, "will inevitably usher in a new nuclear arms race" in a volatile region.

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However, Western knowledge about how India's weapons are stored, transported, and protected, and how the radiological and fissile material that fuels them is guarded and warehoused — the chain of custody — remains rudimentary. After examining nuclear security practices in 25 countries with "weapons-usable nuclear materials," the Nuclear Threat Initiative (NTI), a nonprofit organization headquartered in Washington, in January 2014 ranked India's nuclear security practices 23rd, above only Iran and North Korea. An NTI analyst who asked to remain unnamed told CPI that India's score stemmed in part from the country's opacity and "obfuscation on nuclear regulation and security issues."

But the group also noted the prevalence of corruption in India and the insecurity of the region: the rise of Islamist jihad fronts in India and nearby Bangladesh, Pakistan, and Afghanistan, as well as homegrown leftist insurgencies. "Many other countries, including China, have worked with us to understand the ratings system and better their positions." But India did not, the NTI analyst said.

A culture of quiet

Like the villagers in Challakere, some key members of the Indian Parliament say they know little about the project. One veteran lawmaker, who has twice been a cabinet minister, and who asked not to be named due to the sensitivity of the topic, said his colleagues are rarely briefed about nuclear weapons-related issues. "Frankly, we in Parliament discover little," he said, "and what we do find out is normally from Western newspapers." And in an interview with Indian reporters in 2003, Jayanthi Natarajan, a former lawmaker who later served as minister for environment and forests, said that she and other members of Parliament had "tried time and again to raise [nuclear-related] issues … and have achieved precious little."

Nonetheless, Environment Support Group lawyers acting for the villagers living close to Challakere eventually forced some important disclosures. The region's parliamentary representative heard about plans for the park from then-Indian Defense Minister A.K. Antony as early as March 2007, according to a copy of personal correspondence between the two that was obtained by the group and seen by CPI. (Antony declined to comment.)

This was the very moment India was also negotiating a deal with the United States to expand nuclear cooperation. That deal ended nearly three decades of nuclear-related isolation for India, imposed as a punishment for its first atom bomb test in 1974. U.S. military assistance to India was barred for a portion of this period, and Washington also withheld its support for loans by international financial institutions.

The agreement, which the two sides signed in 2007, was highly controversial in Washington. While critics warned it would reward India for its secret pursuit of the bomb and allow it to expand its nuclear weapons work, supporters emphasized that it included language in which India agreed to identify its civilian nuclear sites and open them to inspection by the IAEA.

India also said that it would refrain from conducting new atomic weapons tests. And in return for waiving restrictions on India's civil nuclear program, the U.S. president was required to determine that India was "working actively with the United States for the early conclusion of a multilateral treaty on the cessation of the production of fissile materials for use in nuclear weapons." In April 2006, then-Secretary of State Condoleezza Rice told the Senate Foreign Relations Committee that the deal would not trigger an arms race in the region or "enhance [India's] military capacity or add to its military stockpile." Rice added: "Moreover, the nuclear balance in the region is a function of the political and military situation in the region. We are far more likely to be able to influence those regional dynamics from a position of strong relations with India and indeed with Pakistan."

Opponents of the deal complained, however, that it did not compel India to allow inspections of nine reactor sites known to be associated with the country's military, including several producing plutonium for nuclear arms. The deal also allowed 10 other reactor sites subject to IAEA inspection to use imported uranium fuel, freeing up an indigenously mined supply of uranium that was not tracked by the international community — and could now be redirected to the country's bomb program.

By May 2009, seven months after Congress ratified the U.S.-India nuclear cooperation deal, the Karnataka state government had secretly leased 4,290 acres adjacent to the villages of Varavu Kaval and Khudapura in the district of Chitradurga to the DRDO and another 1,500 acres to the Indian Institute of Science, a research center that has frequently worked with the DRDO and India's nuclear industry, documents obtained by lawyers showed.

In December 2010, the state government leased a further 573 acres to the Indian Space Research Organisation and the BARC bought 1,810 acres. Councilor Karianna said the villagers were not told at the time about any of these transactions and that the documents, which the advocacy group obtained two years later in 2012, "were stunning. We were being fenced in behind our backs."

Srikumar Banerjee, then-chairman of India's Atomic Energy Commission, first offered an official glimpse of the project's ambitions in 2011, when he told CNN's India channel that the enrichment plant could be used to produce nuclear fuel, or slightly enriched uranium, to power India's heavy- and light-water reactors. However, Banerjee added that the site would also have a strategic use, a designation that would keep international inspectors away. (India's nuclear agreement with Washington and others provides no access to military-related facilities.)

High security, zero accountability

The sensitivity of the Challakere project became clearer after the Environment Support Group legal team filed a lawsuit in 2012 at the High Court of Karnataka, demanding a complete accounting of pastureland being seized by the authorities — only to learn from the state land registry that local authorities had granted the Indian army 10,000 acres too, as the future home for a brigade of 2,500 soldiers. The State Reserve Police, an armed force, would receive 350 acres, and 500 acres more had been set aside for a commando training center.

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In July 2013, six years after New Delhi greenlit the plans, an Indian environmental agency, the National Green Tribunal, finally took up the villager's complaints. It dispatched investigators to the scene and demanded that each government agency disclose its ambitions in detail. The DRDO responded that national security trumped the tribunal and provided no more information; the other government entities simply continued construction.

While the IAEA would be kept out, villagers were being hemmed in. By 2013, a public notice was plastered onto an important local shrine warning worshippers it would soon be inaccessible. A popular altar for a local animist ceremony was already out of bounds.

"Then the groundwater began to vanish," Karianna said. The district is semiarid, and local records, still written in ink, show that between 2003 and 2007, droughts had caused the suicides of 101 farmers whose crops failed. By 2013, construction had fenced off a critical man-made reservoir adjacent to Ullarthi. Bore wells dug by the nuclear and military contractors as the construction accelerated siphoned off other water supplies from surrounding villages.

Seventeen miles of 15-foot-high walls began to snake around the villagers' meadows, blocking grazing routes and preventing them from gathering firewood or herbs for medicine. Hundreds rallied to knock holes into the new ramparts. "They were rebuilt in days," Karianna said, "so we tried again, but this time teams of private security guards had been hired by someone, and they viciously beat my neighbors and friends."

BARC and the DRDO still provided no detailed explanations to anyone on the ground about the scope and purpose of their work, Karianna added. "Our repeated requests, pleadings, representations to all elected members at every level have yielded no hard facts. It feels as if India has rejected us." Highlighting local discontent, almost all of the villagers ringing the kavals boycotted the impending general election, a rare action since India's birth as a democracy in 1947. The growing local discontent, and the absence of public comment by the United States or European governments about the massive project, eventually drew the attention of independent nuclear analysts.

From centrifuges to submarines

Serena Kelleher-Vergantini, an analyst at the Institute for Science and International Security, a Washington-based nonprofit, scoured all the available satellite imagery in the summer of 2014. Eventually, she zeroed in on the construction site in the kavals. The journal *IHS Jane's Intelligence Review* was separately doing the same in London, commissioning Kelley, formerly of the IAEA, to analyze images from the Mysore plant.

What struck both of them was the enormous scale and ambition of the projects, as well as the secrecy surrounding them. The military-nuclear park in the kavals, at nearly 20 square miles, has a footprint comparable in size to the New York state capital, Albany. After analyzing the images and conducting interviews with atomic officials in India, Kelleher-Vergantini concluded that the footprint for enrichment facilities planned in the new complex would enable scientists to produce industrial quantities of uranium (though the institute would only know how much when construction had progressed further). As Kelley examined photos of the second site, he was astonished by the presence of two recently expanded buildings that had been made lofty enough to accommodate a new generation of tall, carbon-fiber centrifuges, capable of working far faster to enrich uranium than any existing versions.

Nuclear experts express the productiveness of the enrichment machines in Separative Work Units (SWUs). Kelley concluded that at the second site, the government could install up to 1,050 of these new hyper-

efficient machines, which, together with about 700 older centrifuges, could complete 42,000 SWUs a year — enough, he said, to make roughly 403 pounds of weapons-grade uranium. A new hydrogen bomb, with an explosive force exceeding 100,000 tons of TNT, requires only between roughly 9 and 15 pounds of enriched uranium, according to the International Panel on Fissile Materials, a group of nuclear experts from 16 countries that seek to reduce and secure uranium stocks.

Retired Indian nuclear scientists and military officers said in interviews that India's growing nuclear submarine fleet would be the first beneficiary of the newly produced enriched uranium.

India presently has just one indigenous vessel, the INS *Arihant*, constructed in a program supervised by the prime minister's office. Powered by an 80-megawatt uranium reactor developed by BARC that began operating in August 2013, it will formally enter military service in 2016, having undergone sea trials in 2014. A second, INS *Aridhaman*, is already under construction, with at least two more slated to be built, a senior military officer said in an interview. Each would be loaded with up to 12 nuclear-tipped missiles. The officer, who was not authorized to be named, said the fleet's expansion gained a new sense of urgency after Chinese submarines sailed across the Bay of Bengal to Sri Lanka in September and October 2014, docking in a port facility in Colombo that had been built by Chinese engineers.

Asked what else the additional uranium would be used for, a senior scientist at the DRDO, who spoke on the condition of anonymity, said it would mostly be used to fuel civilian nuclear power reactors and contribute to what he called "benign medical and scientific programs." The government has not made such a promise publicly, however, or provided details. India does not have to report what it does with its indigenous uranium, "especially if it is not in the civilian domain," said Sunil Chirayath, a research assistant professor at Texas A&M University who is an expert on India's civilian nuclear program.

A senior Obama administration official in Washington, who was not authorized to be quoted by name, expressed skepticism about the government scientist's private claim. The official said that India's civilian nuclear programs, including power stations and research establishments, were actually benefiting from new access to imported nuclear fuel after the embargo's removal in 2007 and now require almost "no homemade enriched uranium."

India has already received roughly 4,914 tons of uranium from France, Russia, and Kazakhstan, for example, and it has agreements with Canada, Mongolia, Argentina, and Namibia for additional shipments. In September 2014, then-Prime Minister Tony Abbott signed an agreement to make Australia a "long-term, reliable supplier of uranium to India" — a deal that has sparked considerable controversy at home.

The International Panel on Fissile Materials estimates that the Arihant-class submarine core requires only about 143 pounds of uranium, enriched to 30 percent — a measure of how many of its isotopes can be readily used in weaponry. Using this figure and the estimated capacity of the centrifuges India is installing in Mysore alone — not even including Challakere — Kelley concluded that even after fueling its entire submarine fleet there would be 352 pounds of weapons-grade uranium left over every year, or enough to fuel at least 22 H-bombs. (His calculation presumes that the plant is run efficiently and that its excess capacity is purposeful and not driven by bureaucratic inertia — two large uncertainties in India, a senior U.S. official noted. But having a "rainy day" stockpile to deter the Chinese might be the aim, the official added.)

Thermonuclear doctrine and the China threat

A retired official who served inside the nuclear cell at the Indian prime minister's office, the apex organization that supervises the military nuclear program, conceded that other uses besides submarines had been anticipated "for many years." He pointed to a "thermonuclear bomb program" as "a beneficiary" and suggested India had had no choice but to "develop a new generation of more powerful megaton weapons" if it was to maintain "credible minimum deterrence."

Previously, this meant the bare minimum required to prevent an attack on India, but a new Indian doctrine in 2003 — in response to Pakistan's increasingly aggressive nuclear posture — altered this notion: "Nuclear retaliation to a first strike will be massive and designed to inflict unacceptable damage." China, the retired official said, "has long had a thermonuclear capability, and if India is to have a strategic defense worth its salt, and become a credible power in the region, we need to develop a similar weapon and in deployable numbers." U.S. and British officials affirmed that they have been aware of this discussion among Indian scientists and soldiers for years.

In an interview, Gen. Balraj Singh Nagal, who from 2008 to 2010 ran India's Strategic Forces Command within its Nuclear Command Authority, the group that manages India's nuclear forces, declined to discuss specific aspects of the nuclear city in Challakere or the transformation of the Rare Materials Plant close to Mysore. But keeping pace with China and developing a meaningful counter to its arsenal was "the most pressing issue" facing India, he said.

“It’s not Pakistan we are looking at most of the time, like most in the West presume,” Nagal said. “Beijing has long managed a thermonuclear program, and so this is one of many options India should push forward with, as well as reconsidering our nuclear defense posture, which is outdated and ineffective. We have to follow the technological curve. And where China took it, several decades before us, with the hydrogen bomb, India has to follow.”

The impact of the U.S.-India nuclear deal and India’s fissile production surge on the country’s neighbors can already be seen. “Pakistan recently stepped up a gear,” the former senior British official said. He pointed to an increase in Pakistan’s plutonium production at four new military reactors in the city of Khushab; a reprocessing plant known as Pinstech, near Islamabad; a refurbished civilian plutonium reprocessing plant converted to military use in an area known as Chashma; and “the ramping up of uranium production at a site in Dera Ghazi Khan.”

The retired British official added: “India needs to constantly rethink what deterrence means, as it is not a static notion, and everyone understands that. But the balance of power in the region is so easily upset.” The official said that in choosing to remain publicly silent, the United States was taking a risk, evidently to try and reap financial and strategic rewards.

Does Washington know?

Officials at the Pentagon argued privately before Washington reached its 2008 nuclear deal with India that lifting sanctions would lead to billions of dollars’ worth of sales in conventional weapons, according to a U.S. official privy to the discussions. That prediction was accurate, with U.S. exports of major weapons to India reaching $5 billion from 2011 to 2014 and edging out Russian sales to India for the first time.

“But the U.S. is also looking for something intangible: to create a new strategic partner capable of facing down China,” and so India has taken advantage of the situation to overhaul its military nuclear capability, the British official noted. Pushing back China, said the official, who has worked for 30 years in counterterrorism, weapons of mass destruction, and nonproliferation, especially in Southern Asia, is regarded as being “in everyone’s interest.”

White House officials declined to comment on this claim on the record. But Robert Einhorn, the State Department’s former top nonproliferation official, told the Carnegie International Nuclear Policy Conference in March that some officials in the Bush administration had the ambition, in making a nuclear deal with India, to “work together to counter China, to be a counterweight to an emerging China.” He added that, in his view, that ambition has not been realized, due to India’s historic insistence on pursuing an independent foreign policy. He also said the nuclear deal had unfortunate repercussions, because other nations concluded that Washington was playing favorites with India.

In Challakere, construction continues despite a ruling by the National Green Tribunal in August 2014 calling for a stay on all “excavation, construction and operation of projects” until environmental clearances had been secured. Justice M. Chockalingam and R. Nagendran of the tribunal ordered blocked roads reopened with access given to all religious sites. But when villagers attempted to pass over or through the fences and walls in the winter of 2014, they were met by police officers who hand out photocopied notes in English: “Environmental clearances has [*sic*] been awarded [to BARC] dated 24 July 2014, which is a secret document and cannot be disclosed.”

Councilor Karianna said: “Still, to this day, no one has come to talk to me, to explain to us, what they are doing to our land.”

“Is this what ‘national interest’ means?” he asked, looking out over the rolling pasture, enveloped in the red dust kicked up by diggers. “We sit beneath our ancient trees and watch them tear up the land, wondering what’s in store.”

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