There's too much hype about Pakistan's nuclear capability: Anil Kakodkar

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Nuclear physicists Kakodkar and Gangotra believe India's nuclear industry "lost time" due to liability regime that followed 2008 nuclear deal, say country should aim for 50% nuclear energy, and insist that the space programme is about "national pride", not jingoism

Nuclear physicists Anil Kakodkar (centre) and Suresh Gangotra (right) with Resident Editor, Pune, Amitabh Sinha in The Indian Express newsroom Amit Mehra

AMITABH SINHA: Your book talks of two epoch-making events that happened over two decades — the 1998 nuclear explosions and the 2008 civil nuclear deal between India and the US. It has been more than 20 years since the explosion, over 10 years since the deal was signed. Looking back, have we achieved the strategic objectives that these events aimed to achieve?

ANIL KAKODKAR: Well, I would say a good part of it has been achieved. Today, we are a de facto nuclear weapon power, though not de jure. The world looks at us as a country which is to be taken seriously and India's standing globally has improved. Part of that can be attributed to the emergence of India as an economic power, but the strategic strength given by the 1998 nuclear tests has played a very important role too. On the civil nuclear energy cooperation, the objective was to obtain nuclear technology for the development of our nuclear programme, in accordance with our national needs — both strategic and socio-economic needs. (Nuclear-produced) electricity was probably the most important… Following the

(nuclear tests of) 1974 and 1998, international embargoes were becoming tighter. So we struggled to get the technology. Also, we didn't have (enough) uranium… So the point is, you have the technology but you can't produce electricity in the required amount because you don't have fuel… (and) you couldn't access uranium from outside. That we are able to do today (following the civil nuclear cooperation agreement).

"If someone says your adversary has this much readiness, we should not discount that... Having said that, there is too much hype about Pak's nuclear capability. Also, there is probably a nexus between China and Pak"

WHY ANIL KAKODKAR & SURESH GANGOTRA

ANIL KAKODKAR, A FORMER chairman of the Department of Atomic Energy (DAE), is among the few associated with both the 1974 and 1998 nuclear tests. Kakodkar was also one of the key architects of the 2008 India-US nuclear deal. In 2015, he resigned as chairman of the board of governors of IIT Bombay, apparently over differences with the HRD Ministry. Kakodkar's new book, *Fire and Fury: Transforming India's Strategic Identity*, which he co-authored with Suresh Gangotra, senior technical advisor to the DAE chairman, offers a broad view of India's nuclear programme

"That we have more IITs is a very good thing... but why this expansion so suddenly. Why such mad rush?... Then there are cultural issues... inculcating creative pursuits in children needs different kind of handling"

Also, this (the nuclear deal) happened just at the right moment. The capacity factor of power plants was continuously going down and down. I was terribly worried at some stage that NPCIL (the Nuclear Power Corporation of India Limited, that runs India's nuclear reactors) will start getting into red. Now that the uranium question is behind us, that constraint has gone. Today, the government has approved, apart from the six PHWRs (Pressurised Heavy Water Reactors), which are already under construction, 10 units to be constructed in one go, in fleet mode. So hopefully, one will see a growth which will not be constrained due to uranium supply.

AMITABH SINHA: You had earlier said that both the 1998 nuclear tests and civil nuclear deal would have happened regardless of the political party in power. But in the book you also say that there were some differences of opinion within the establishment, within the MEA and even within the scientific community. What were the opposing arguments on these two issues?

KAKODKAR: In a large group, there will always be multiple opinions, and decision-making is always about taking a decision on balance. On the nuclear tests, for example, one of the questions was also that if you do the test, what will be the repercussion, what will happen to the economy… Different people had different takes on this, and this had happened even during the 1974 tests. Same thing happened during the debate on the civil nuclear cooperation — one school of thought was that the geopolitical situation was just right, the US was coming so close to us, and we shouldn't lose this opportunity at any cost. There was another viewpoint, some of it from right within the Department of Atomic Energy itself. Some of the nuclear scientists, the stalwarts, were saying look, you can't trust the US… you're pushing the country into serious trouble. So, what you saw in the debates at that time was basically a reflection of these issues.

AMITABH SINHA: In the book, you also mention that Dr A P J Abdul Kalam (who was then Defence Research and Development Organisation head) was not entirely convinced of the need to include a thermonuclear device in the 1998 tests. What were his arguments?

KAKODKAR: Prior to 1998, India had already developed its nuclear weapons designing based on the 1974 tests. The weaponisation part was largely done. It was about actually demonstrating it through another series of tests. There is always this feeling that if we can do two tests instead of one, and both are successful, then we can say our design is more reliable. If we can do five, we can say it is even more reliable. Now, India was unlikely to get any further opportunity to carry out tests (after 1998). So, we were keen to demonstrate our thermo-nuclear capability as well. Not that anyone was against it. In fact, Dr Kalam actually wanted that. His problem was that there was a populated village, Khetolai, just 5 km from the test site. We calculated that if the explosion of the tests was below 60 kilo ton, then the village would be safe. Now, the fission device we were testing was 15 kilo tons. So, the thermonuclear capability we were trying to prove had to be below 45 kilo tons. The confidence that Dr Kalam was seeking from us was that the thermonuclear explosion could certainly be controlled to 45 kilo tons, and not go over that. Because if that happened, it could have had serious consequences. Now, there couldn't just be verbal assurances. So Dr Kalam told me, 'I think it's better you write it down'. And I agreed to it.

RAVISH TIWARI: The political argument for the civil nuclear deal was that nuclear power would be a replacement for conventional resources that India is so short on. Ten years down the line, what is holding up India's nuclear power generation? Also, Mr Gangotra, with so many international agreements, does the nuclear industry find its hands tied up?

KAKODKAR: On the nuclear power generation, we should recognise that the issues connected with the liability Act have actually been a very big damper… (The Civil Liability for Nuclear Damage Act, 2010, allow lawsuits to be brought against suppliers for nuclear reactor accidents, with liability fixed on nuclear plant operators.) The liability regime internationally has come from a very different perspective… In case of a major accident, people need to be protected, and there has to be a provision for guaranteed compensation. But that burden (of compensation) should not fall on a single commercial entity. A set of industries that are behind nuclear technology… we should ensure that their businesses remain protected. So, there was this concept of shared responsibility for the industry. Now, following the Union Carbide episode, the mood in India was obviously quite different, and that is why the liability Act has some different provisions compared to the other original liability laws… I would say because of this liability clause, our nuclear programme must have been delayed by at least four to five years. For instance, when tenders for the Haryana project (for a new nuclear plant) were floated, there were few takers because of the uncertainty. So we lost time. Something that should have happened maybe four or five years ago, is beginning to happen only now. But, I think, going forward, this process will get accelerated.

The second issue is this greater realisation of climate change. It has given a very welcome boost to renewable energy… My rough estimate is that we should aim for an energy basket that is 50% nuclear and 50% renewables.

SURESH GANGOTRA: About international agreements, I don't think our hands are tied. On the contrary, there are many things that these agreements have enabled. One of the most important is that we have been able to access uranium from

the international market. Had that not been the case, many of our reactors would not have been operating at capacity factors that they have been operating at. The task ahead for serving and future nuclear scientists includes mastering of this PHWR technology and then going into the second stage of our three-stage nuclear programme.

SHUBHAJIT ROY: I wanted to get your sense on the nuclear weapons programme of two of our neighbours — Pakistan and China. What is Pakistan's capability status and how potent is their programme? On China, how ahead of India are they in terms of potency and capability?

KAKODKAR: It is very difficult to talk about this in an authentic way because we are not privy to all the information. In matters of nuclear weapons, we should be ready for all eventualities… If some adversary or anybody else says that your adversary has this much readiness, I think we should not discount that… Having said that, I have reason to believe that there is too much hype about Pakistan's nuclear capability. Also, there is reason to believe that there is probably a nexus between China and Pakistan. For example, one of the issues which we have discussed in the book is this aspect of whether Pakistan tested plutonium-based weapons. On the face of it, they were all uranium weapons, but we know that there is a huge emphasis on plutonium production for weapons in Pakistan. If that is so, where has the validation of plutonium weapon designs come from? Obviously, one can draw conclusions. So, I don't want to discount whatever is being said, though I have reason to believe that a significant part of that is a hype.
Coming to China, I know that even in the '90s, the Chinese nuclear establishment was three-lakh strong and their programme had been running for a much longer time.

RAVISH TIWARI: What is our size?

KAKODKAR: Well, we are around 50,000 to 60,000. But, our size, a large majority of that, was for the civilian programme. The Chinese civil programme, particularly the electricity generation programme, started much later than India's, but their establishment was that big. So obviously China is a much bigger power.

ANANTHAKRISHNAN G: Do we need to test again?

KAKODKAR: As I said, for a country like India, we are not going to get these opportunities again and again, and that is why we were very eager that we should prove thermonuclear capability. But we also knew that while these two large tests will prove capability on the basis of which we can build a deterrent, there was also a need to test a large number of ideas and we knew that we can't be testing so many things with discreet individual tests. So we decided to work in terms of what is known as integral tests… The way the scenario exists today, I think it is unthinkable that any country would carry out nuclear tests unless you want to become North Korea. So with that option not being there, I think we have secured enough confidence to be able to carry out continuous design improvements and evolve new systems on the basis of these tests, but there is always this issue of dil mange more.

RAVISH TIWARI: How do you look at our civil and military technology capabilities? For instance, there was a lot of jingoism around Chandrayaan 2. Considering that some countries landed men on moon 50 years ago, are we still reinventing the wheel so far as frontline technologies are concerned?

KAKODKAR: I wouldn't be so negative about this. I don't champion jingoism but I think there is a huge importance to national pride. Whatever one may say, the space programme has created a huge amount of national pride, motivation, everybody wanting to do something. And I think that is a huge contribution, you can't visualise the positive impact it would have on the country. It's huge, according to me. Today if you ask a child what he wants to do, a significant fraction of students would say they want to be in that space school in Trivandrum. So it has made that difference. So I don't call it jingoism because things don't happen until you are proud of yourself and that self-confidence has to come. Having said that, how many countries have entered Mars orbit in the first attempt? Nobody, except India. So is that not a matter of pride? It is not as if everybody has succeeded in soft landing (on the moon) the first time. Many countries have failed. So I won't hold it against them.

AMITABH SINHA: After your retirement from the atomic energy establishment, you have been associated with higher technical education, especially with the IITs. What has been happening on the education front in the last four to five years?

KAKODKAR: By and large, things are moving forward in a positive way. The fact that we have many more IITs than earlier is a very good thing. More NITs have come about. These are great developments. Now, I have my doubts about the wisdom of doing this expansion so suddenly. For decades, no expansion took place. Why is there so much of mad rush? Why children get burnt-out by the time they arrive in IIT is because there is such a large need but so little opportunity. So now the question is, if India has to go forward, investment in education, investment in health sector, these are all very crucial things. I think things are happening but perhaps much more needs to happen. I don't think we are investing as much as we should.

Then there are cultural issues. Creative pursuits have to be handled in some way and inculcating that kind of mindset in children requires a different kind of handling. At the centre of it all are teachers. You can't say that I have a national programme of inculcating creative pursuits and I have standardised templates.

AMITABH SINHA: Across higher education campuses, including some of the IITs, we are seeing protests. Do you see that as part of a culture that needs to be inculcated — of students coming out and expressing themselves?

KAKODKAR: I think these are two different things. What I am talking about is a culture of being inquisitive, a culture of wanting to learn from everything that you see… You know young people will get exercised about issues, whether you like it or not. I firmly believe that young people should not get into politics. But that doesn't mean that if something is happening, their minds won't get exercised. And if their minds get exercised, I think it'll find expression. So, I think whatever is happening is only natural.

VANDITA MISHRA: How does this culture of inquisitiveness and scientific temper sit with the overt display of religiosity? Say, when a puja happens before a Rafale plane is flown?

KAKODKAR: This is a complex issue. For example, I have headed the Department of Atomic Energy, so I have been a part of several projects. Sometimes you start the foundation, people ask me to do puja and I do it. They ask me to break a coconut, I break a coconut. In my house, if my mother says tomorrow we are going to do Satyanarayan puja and you and your wife will sit there, I do that. In the heart of hearts, I'm a religious person, I believe in God, but I don't believe in rituals. I may conform to something as a family tradition. I may conform to something as a societal tradition… Our Constitution talks about inculcating scientific temper, and I do believe in that. But at the same time, I won't hold it against anyone…

SHUBHAJIT ROY: India has been very keen on getting permanent membership of the Nuclear Suppliers Group. Right now, if India wants, it can have bilateral arrangements with three or four prominent countries which actually can offer that kind of high technology. So why is it important to be part of the group?

KAKODKAR: No, it's not the question of accessing technology. First of all, while we should, of course, access technology from wherever, whatever technology we need, we should also have a domestic programme of development of the technology ourselves. And both have to go hand in hand. The issue with respect to the Nuclear Suppliers' Group (NSG) is primarily that it works on consensus. So if you are outside the group, the rules of the group can change without your being there, and it may create harm for you. If you are a member of the group, then the rules cannot change without your concurrence. And so it gives you the ability to protect your interest and in that sense, membership is very important. It would be a part of our diplomatic efforts. I think we should start really acting big. What does it mean to be a member of the NSG? Members of the NSG are countries which have the capability of being a nuclear supplier. We are a nuclear supplier but we are small right now. I think we should be big and we have that capability to really do so, and if you do that, maybe the process of becoming a member will be shortened.