# A view of science in India*

*A. B. Vajpayee*

I must confess that both my work and my background are far removed from science. Yet, science and its achievements have always fascinated me. Besides fascination, science produces another impact on the lay mind. It creates national self-confidence. For example, our achievements in space science, computer science, agricultural sciences, chemical engineering, oceanography and of course, nuclear science fill our hearts with immense satisfaction.

Hence, I see a two-fold role for Indian science. On the one hand, it must continue to do what it is best at – improving the lives of the people and contributing to the development of India as a strong and vibrant economic power. Simultaneously, Indian science must strive for excellence, which boosts our national self-confidence.

It is in order to draw the nation's attention to this two-fold benefit from, and responsibility of, Indian science that last week at Pokharan I gave the slogan: *Jai Jawan, Jai Kisan, Jai Vigyan*. I gave this slogan not just in recognition of the astounding scientific progress made by our nuclear scientists. Rather, Pokharan today symbolizes one of the greatest promises of science to transform India into a secure, self-reliant and prosperous nation.

The slogan makes no claim to originality. I have only added two words to the electrifying slogan coined by our late and highly respected former Prime Minister, Lal Bahadur Shastri, after the 1965 war. But I do believe that those two words, if understood well and acted upon well, have the potential to transform the face of India.

How shall we back this motto of *Jai Vigyan* with action? Permit me to present certain suggestions for the consideration of the scientific community, industry and policy makers in the Government.

One, we must make science and scientific temper an integral part of our national life and culture. Specifically, what is needed to universalize the scientific spirit, is to launch what I would call an 'Innovation movement'. The essence of science is innovation – that is, newness in thinking and action. Can we, as a nation, resolve to do whatever we are doing in our individual or collective spheres in better, more efficient, more economical, and more satisfying ways?

Two, as far as institutionalized pursuit of science is concerned, what is coming in the way of progress is not so much money but the bureaucratization of the institutions that we have created. We need to make science, and the practitioners of science, central to all our planning and operations. Administrators and government officials should be facilitators, and not masters, of scientists. They should create conditions that encourage young scientists to do research and not push papers. Only in such an enabling environment can Indian science flourish. Any other way of managing science will only stifle it. This needs a radical change in the mindset of our science administrators.

Sustained motivation among scientists, especially young scientists, is absolutely cardinal to what we want to achieve. We should no doubt improve the working conditions and monetary rewards for our scientists. But, equally important, we should increase what I like to refer to as the 'intellectual and psychic income', which all of you treasure the most.

Three, it is sad that our system allows only an inferior status to engineers. The best engineering talent migrates from India to greener pastures either abroad or within the country. I am told that a large number of bright young people who get a degree in engineering subsequently branch off into non-engineering jobs which have a higher prestige and a bigger pay packet. As a result, areas such as manufacturing, original design and development of technology, and solving problems at the shop-floor have suffered. This needs to be reversed.

Four, we simply cannot neglect, as we have done so far, promotion of R&D in industry. I feel very worried when I see that investments in R&D by our industry, especially private industry, are miniscule compared to international standards. Naturally, there are hardly any products or brands coming out from Indian industry which can stand global competition today.

Our industries must create knowledge networks with our universities, IITs and national laboratories in a 'Team India' mode. For instance, right here we have the massive chain of 40 research laboratories of CSIR, in which the country has made heavy financial and human investments over the last fifty years. I urge the industry to forge powerful partnerships with these laboratories to gain entry into the global marketplace with winning technologies and then acquire a leadership position.

My vision is also to see many of these research laboratories as tomorrow's self-financing 'Knowledge corporations' with both financial and operational autonomy, and capable of becoming world-leaders in their own right.

Five, we need to accord greater recognition to highly talented scientists not only within the scientific community, but also in the larger national community. Today, the entire nation feels proud of the Pokharan team led by Abdul Kalam, Chidambaram, Kakodkar and Santhanam.

The Indian tradition has always held *gyanis* – that is, persons of learning – in a higher esteem than the rulers. It is, therefore, not surprising that Abdul Kalam should be a Bharat Ratna, whereas I am only a Padma Vibhushan! I want this kind of recognition for the other achievements of Indian scientists as well. I want to bring Indian science and Indian scientists to the forefront of our nation's attention. In this, the media can play a vital supportive role by giving prime-time and prime-space focus on our scientific talent.

Six, there is a need to make scientific research in our country more and more

*Excerpted from the speech of the Prime Minister at the presentation ceremony of the 1997 Shanti Swarup Bhatnagar Prizes on 25 May 1998.

application-based. The questions that ought to seize the minds of both scientists and the people in government and industry are many.

For example, our agriculture scientists deserve a pat on the back for helping India attain food self-sufficiency. Their efforts in boosting wheat production have greatly succeeded. Now, how can we extend that success to other crops, especially in those areas where our kisans depend on dryland farming? How can we expand and improve our base of agro-based rural industries, which not only add value but also generate local employment? How can medical research bring down the cost of health-care? How can we launch a massive nation-wide drive for energy-saving and material-saving? How can we produce *more* with *less*?

Some of the problems in this area are truly critical and brook no delay. Water conservation is one of them. Our scientists and our society must together find early answers to this problem.

Seven, we need to make the use of Information Technology a national campaign. My Government has set up a Task Force that will prepare the draft of a comprehensive National Informatics Policy. It will also recommend an appropriate institutional mechanism to implement it as a national mission.

This is an area where India can attain global dominance in a short time. Besides, thousands of new applications are possible in this area which will generate high-quality jobs and improve the quality of life for the masses. I would, therefore, urge the scientific community to take up Information Technology-based research as a challenge. You should help create products and services that will serve as a productivity-multiplier within India and also command high value in the world market.

Eight, Indian science must face globalization with courage and confidence and make it work to our national advantage. As I had remarked in my first television address to the nation, India has a right to be angry at seeing foreigners filing patents on *haldi*, *neem* and *basmati* rice. We will fight these patents and safeguard India's national interests. Indeed, CSIR has shown the way by winning the battle over the *haldi* patent.

It is far more important, however, to know that we should develop more and more patents ourselves and also quickly move in the direction of their commercialization. There is a need to bridge the time gap between discovery and the marketplace. Let me emphasize that, increasingly, Intellectual Property Rights will become key strategic tools in the emerging era of knowledge-based competition. I am happy, therefore, to learn that CSIR has filed as many as 90 patents in USA and Europe in last year alone, protecting our exclusive technologies and our traditional knowledge. This is an example that other research institutions could do well to emulate.

Nine, in order to lift the prestige of Indian science, both nationally and internationally, I would strongly urge you to focus on some select areas of research, including basic research, where you can show global excellence. Let India become a leader, and not merely a follower, in science at least in some areas. Let us open up exciting new frontiers of knowledge ourselves, with the goal that some of these will be worthy of Nobel Prizes in the first decade of the next century.

Last but not the least, we must pay attention to our children. We must overhaul the system of science education in the country to base it on knowledge and creativity, and not on memorizing and examinations. I am convinced that our young generation is far brighter than my generation. They also have access to powerful learning tools such as computers, the Internet and television. It is our responsibility to create an educational system which will allow the unlocking of the enormous storehouse of intellectual energy in our young generation.

These suggestions are neither exhaustive nor conclusive. I urge the entire Indian scientific community – that is, old and young scientists, science teachers and students, science administrators, science popularizers, the media, industry and policy-making bodies in the Central and State governments – to deliberate on how to harness the full potential of science for nation-building.

After a few months of nationwide discussions, we should come up with an energizing charter of action. As far as my Government is concerned, I have no doubt about our fullest and most enthusiastic support to its implementation. I say this because the Minister of Science and Technology, Murali Manohar Joshi, is himself not only a scientist and a teacher, but also brings deep personal commitment to this cause which is so dear to his heart.