

We Need a Coffee Shop Where Basic and Applied Science Meet

K VijayRaghavan, principal scientific advisor to the Government of India, talks to Malini Goyal about Indian science, its challenges, possibilities and the future. Edited excerpts:

On India's bet on mega science projects
CERN is a search for new particles and the quest to understand the universe. Such projects bring in a better understanding of science and collateral technology with significant returns. CERN has transformed the French and Swiss science ecosystem.

India has undertaken many big projects in the areas of space, atomic energy etc. These projects have helped us build high-tech capabilities, develop our human resource and give a boost to the local industry. Mega projects help us interact with global ecosystems and top scientists, deepening their bonds with India. On contemporary issues like climate change and sustainable development, India can take the lead.

Besides mega science projects in areas like astronomy, physics and biology, we are also looking at agriculture, health and climate where projects may be less expensive but would have a dramatic impact on people's lives. Affordable health and nutrition, cleaning rivers and environment, agriculture and deep ocean exploration are areas where India can lead.

On the way forward

From GMRT to LIGO, Indian scientists have done a great job of working on mega science projects. We must now move ahead. In the last five years, India's science budget has doubled and the number of faculty has risen sharply. With so many youth, we must now nurture world-class young talent. With our population, we should have proportional representation of Indians at the top of big universities and projects globally. When you visit hospitals anywhere in the world, you see Indians. This should be in science, too. That's our mission for the next five years. We should also lay stress on training women in high-tech areas. It would be silly and also incorrect to exclude women.

On problems with India's science, and the basic-versus-applied debate

I don't see where the dilemma is. What is needed is not so much more basic or applied science but a coffee shop where the two meet and test boundaries, connect and collaborate. Our top institutions are high in quality but operate in silos. They need to do that.

We're now trying to develop a specialised cadre of people in science who would go back and forth, be the glue, blur boundaries

and foster collaboration. Today, the only route open to our trained students/researchers is to become a professor.

There could be exciting opportunities in the industry and startups. Let me explain. India has 15 agri-climatic zones, each with its own problems and unique solutions. The western Himalayan region is one such zone.

IIT-Roorkee is the lead nodal institution. It will connect with hundreds of institutions and work on problems in the area, mentor talent and nurture a startup ecosystem to find solutions and commercialise them. Similarly, IIT-Bombay can focus on sectors like petrochem and manufacturing.

We want science institutions in big cities to work closely with those in smaller ones. Our national labs must share physical and intellectual infrastructure with others, including the private sector. This feeder mechanism will help expand research footprint.

On industry-academia partnership

The problem is India's spend on S&T is 0.7-0.8% of GDP as compared with advanced countries that spend 2%. In advanced countries 70% of funds come from the industry and in India 20%. Even that is dominated by 10-15

companies, mostly PSUs.

The industry does not suffer from capital shortage but shortage of risk capital. The plan is to push our labs to invest in people and partner companies to work on projects to lower risks. For example, government labs are developing civilian aircraft. Typically, aerospace labs work together. They should not rule out the possibility of partnering with the industry too.

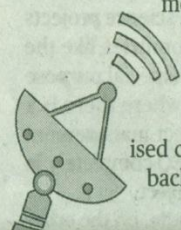
On policy flip-flops (like in electric vehicles) and influence of science in government's decision making

India's development should be socially inclusive, not divisive. The decision-making must be democratic. You will see multiple, well-argued viewpoints. What you refer to as policy flip-flops is actually the evening out of well-argued viewpoints over the long term. This is a valuable mechanism in a democracy.

On India lagging behind China

China's route to big science has been to focus on in-house projects. Three decades of 10%-plus growth helped (fund it). The point is not to mimic China but to find our own path. China sent people abroad on generous fellowship. We have to nurture world-class scientists here.

In training, we must emphasise on two areas: the ability to analyse data and a deep understanding of the basic domain. ■



AMARENDRA JHA

