

Contrary to prevailing perceptions, many political parties are indeed serious about science, technology and innovation!*

The dance of Indian democracy is truly powered by many far-reaching frugal innovations in the country, the most visible being the near fool and fail-proof electronic voting machine or EVM! Unbelievable, but yes most political parties are indeed serious about science, technology and innovation!

In its manifesto, astonishingly on science the Bhartiya Janata Party (BJP) draws inspiration from an Islamic scholar; the Indian National Congress has almost forgotten about Jawaharlal Nehru's 'modern temples'; and the Aam Admi Party (AAP) has failed to even list its guttural allergy to nuclear energy.

The solid bedrock for efficient management of India's general elections are the 1.4 million EVMs, made through truly 'desi' frugal innovation, the fruits of indigenous science and technology (S&T). EVMs were developed by Indian engineers at the Bharat Electronics Limited (BEL), a public sector unit of the Ministry of Defence, and the Electronic Corporation of India Limited (ECIL), a public sector unit of the Department of Atomic Energy. The proud selfies that flaunt the voters pride on the fingers are thanks to the indelible India ink, another great Indian innovation by the Council of Scientific and Industrial Research (CSIR), New Delhi.

But how does science, technology and innovation fair among the various manifestos of the political parties. It may not be part of the daily vitriol, but most do seek to support science, technology and innovation.

The grand old Congress Party whose first Prime Minister Jawaharlal Nehru coined the phrase 'scientific temper' and described large engineering structures as 'modern temples', in its 50-page 2014 election manifesto barely has a single paragraph on S&T, where it mentions 'the Indian National Congress will increase the annual expenditure on science and technology to at least 2% of GDP. This has to come from both government and industry. Steps will be taken to encourage the corporate sector to invest

in Research and Development.' A clear admission that the repeated promise of this doubling of budget made possibly for the first time in 1989 by the then Prime Minister Rajiv Gandhi and now repeated like litany even by Prime Minister Manmohan Singh in the last decade, still remains a distant dream.

In contrast, the challenger in the form of BJP in its 42-page manifesto has devoted more than two full pages on issues relating to S&T. In contrast, the making of the 'Ram Mandir' at Ayodhya is merely mentioned in two lines on the penultimate page. Interestingly, the BJP which is often described as a 'Hindu nationalist party', in the preface of its 2014 manifesto draws inspiration from and quotes a 11th century Spanish Muslim scholar, Al-Andalusi saying 'the first nation to have cultivated science is India'.

The BJP promises an 'innovative and technologically driven society' in its pledge. Not surprisingly, it draws inspiration that 'India has been a knowledge economy and has been a leader in S&T from ancient times' and emphatically states the 'BJP recognizes the need to create an ecosystem for fundamental research and innovation ... scientific education and technology needs to be encouraged, promoted, practiced and leveraged with renewed vision and vigour'. This should be music for India's vast science, technology and innovation network. The BJP promises to build world-class regional centres of excellence in the fields of nanotechnology, materials science and brain research, seeking to establish 'institutes of technology for rural development'. It desires to establish a central university dedicated to 'Himalayan technology', whatever that means!

In direct contrast, the party that has caught the imagination of the middle class and many well-meaning scientists, AAP has not even mentioned what it promises to do in the sector of S&T in its 26-page manifesto; probably seeking guidance from its party symbol 'the broom', S&T has been swept aside.

The Communist Party of India (Marxist; CPI-M) in its 35-page manifesto has about a third of a page on S&T and promises 'enhancing public funding of

indigenous research in science and technology to 2% of GDP as against 0.8% to promote self-reliance'. True to its DNA, the CPI-M says it will 'stop training and orientation of Indian Patent office personnel by the US and European Patent offices'.

Genetically modified organisms are a 'hot potato'!

The Congress Party does not mention what it plans to do with policies related to genetically modified (GM) organisms, even though in 2010 the Party's nominee, the then Environment Minister Jairam Ramesh imposed an indefinite moratorium on the release of GM *Bt* brinjal. Taking a highly precautionary position, the BJP in its manifesto says 'Genetically Modified (GM) foods will not be allowed without full scientific evaluation on its long-term effects on soil, production and biological impact on consumers'. This seems to fly in the face of the so-called success of the much touted Narendra Modi-led 'Gujarat model', where India's first GM crop, *Bt* cotton has been a 'run-away success'. Even the AAP takes a cautious stand saying 'it will regulate genetically modified crops to ensure that safety to food, human health and environment is ensured before the introduction of irreversible technologies'. If the manifestoes are an indication of which way the wind is blowing, the going may not be easy for the widespread diffusion of GM crops in India.

Power of the atom speaks loud!

In 2008, Prime Minister Manmohan Singh staked the future of his government on the adoption of nuclear energy in India, yet in the 2014 manifesto, it appears merely as a passing footnote when it states 'we will give a new thrust to new and renewable energy, including hydel, solar and nuclear energy.' What a climb down and today we do not even know if Rahul Gandhi loves or hates nuclear energy, or does he even know the difference between 'fission and fusion

*Views expressed are personal. An abridged version of this letter appeared in *The Hindu* dated 30 April 2014.

Box 1. Some poll promises verbatim**Bhartiya Janata Party's 2014 manifesto**

<http://www.bjp.org/manifesto2014>

Science and technology – India Innovates and India Leads

India has been a knowledge economy and has been a leader in science and technology from the ancient times. India now needs policies and programs to reclaim its global leadership position in science and technology. BJP recognizes the need to create an ecosystem for fundamental research and innovation, keeping the objective of science with a human face in the service of the common man. Science and technology has enormous potential to bridge the disparities between the urban and rural India, rich and poor. Scientific education and technology needs to be encouraged, promoted, practiced and leveraged with renewed vision and vigour.

BJP recognizes the central role of science and technology in raising the quality of life of the people of the country, particularly of the disadvantaged sections of society in creating wealth for all, in making India globally competitive, in utilizing natural resources in a sustainable manner, in protecting the environment and ensuring national security. We will also encourage and incentivize private sector investments – both domestic and foreign, in science and technology and in high-end research aimed towards innovation.

We will focus on the following:

- ensuring food, agricultural, nutritional and environmental, wealth, health and energy security of the people on a sustainable basis, using science and technology.
- mounting a direct and sustained effort on the alleviation of poverty, enhancing livelihood security, removal of hunger and malnutrition, reduction of drudgery and regional imbalances, both rural and urban, and generation of employment, by using scientific and technological capabilities along with our traditional knowledge pool.
- encouraging research and innovation in areas of relevance for the economy and society, particularly by promoting close and productive interaction between private and public institutions. Sectors such as agriculture (particularly soil, water management, human and animal nutrition and fisheries), water, health, education, industry, energy including renewable energy, communication and transportation would be accorded highest priority. Leveraging of technologies such as information technology, biotechnology and material sciences would be done with special importance.
- encouraging research and application to meet the challenges of climate change and for forecasting, prevention and mitigation of natural hazards, particularly floods, cyclones, earthquakes, drought and landslides.
- promoting international science and technology cooperation towards achieving the goals of national development and security, and making it a key element of our international relations.
- devise schemes, programs and opportunities to encourage the youth to take scientific research and innovation as a career.
- provide work environment and professional opportunities in fundamental scientific research, to make research careers more appealing, so that the nation can harness the best of brains for scientific research leading to enhancing the national productivity and competitiveness and reverse brain drain.
- build world class, regional centres of excellence of scientific research in the field of nanotechnology, material sciences, thorium technology and brain research.
- create an ecosystem for multi-country and inter-disciplinary collaborative research, and establish an Intellectual Property Rights Regime which maximizes the incentive for generation and protection of intellectual property for all type of inventors.
- achieving synergy between industry and scientific research. Autonomous technology transfer organizations will be created as associate organizations of universities and national laboratories to transfer the know-how generated by them to industry. Industry will be encouraged to adopt or support educational and research institutions to help direct science and technology endeavours towards tangible industrial goals.
- promotion of innovation by creating a comprehensive national system of innovation.
- indigenous knowledge, based on our long and rich tradition will be further developed and harnessed for the purpose of wealth and employment generation
- to promote science popularization schemes extensively.
- bring the changes in secondary education to focus on application of science.
- set an institute of big data and analytics for studying the impact of big data across sectors for predictive science.
- to do research for the eradication of tropical diseases.
- establish institutes of technology for rural development.

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Box 1. (Contd)

- establish a Central University dedicated to Himalayan technology.
- promote research and application of nuclear science in medicine, industry and agriculture. We believe science and technology should be used to build a new and resurgent India that continues to maintain its strong democratic and spiritual traditions, that remains secure not only militarily but also socially and economically. Our science and technology policy will be framed and implemented so as to be in harmony with our worldview of the large human family. We will ensure that science and technology truly uplifts the Indian people and indeed all humanity.

All India Congress Party

<http://inc.in/manifesto/>

Innovation, Information and Communication Technology

The Indian National Congress will increase the annual expenditure on science and technology to at least 2% of GDP. This has to come from both government and industry. Steps will be taken to encourage the corporate sector to invest in Research and Development.

Communist Party of India (Marxist)

<http://www.cpim.org/elections-2014/manifesto>

Science and Technology

Enhancing public funding of indigenous research in science and technology to 2% of GDP as against 0.8% to promote self-reliance; strengthening the university system in research and development; fundamental research in the sciences to be accorded priority

- New initiatives with adequate funding in emerging technologies such as solar
- Create capability in electronics, including microelectronics
- Initiating programs to break the monopoly of drug multinationals in critical areas
- Focusing on agricultural research to break monopolies of companies such as Monsanto in seeds
- Promoting free software and other such new technologies, which are free from monopoly ownership through copyrights or patents; 'knowledge commons' should be promoted across disciplines, like biotechnology and drug discovery
- Revamping the functioning of the Patent offices to ensure strict adherence to the Indian Patent Act; Stop training and orientation of Indian Patent office personnel by the US and European Patent Offices

Aam Admi Party

<http://www.aamaadmiparty.org/manifesto-2014>

Improving Farmers' Livelihoods

Regulate genetically modified crops to ensure that safety to food, human health and environment is ensured before the introduction of irreversible technologies.

energy' as he has never spoken about it, at least openly. In contrast, the AAP ideologue advocate Prashant Bhushan, who, stridently argued in the Supreme Court against the opening of the nuclear power plant at Kudankulam, Tamil Nadu, has been sidelined by his own party as it does not even mention anything on what its policy is on issues related to nuclear energy, despite the fact that it has nominated the activists who spearheaded the agitation against the Kudankulam atomic reactors as the candidates for election to the Lok Sabha. Even the CPI-M that

pulled out of the United Progressive Alliance says in its 2014 manifesto that it will be 'revising the Indo-US nuclear agreement; no import of foreign nuclear reactors; pursue self-reliance in civilian nuclear energy based on domestic uranium and thorium reserves'.

The BJP has thrown up a surprise in the area of nuclear energy by not only seeking to 'study in detail India's nuclear doctrine, and revise and update it', though the party chief Rajnath Singh and Narendra Modi have clarified that there will be no 'rethink' on the policy related

to 'no first use' of nuclear weapons. On the side of nuclear energy, the BJP asserts more than once that it will 'invest in India's indigenous thorium technology program' while also stating that 'we will follow a two-pronged independent nuclear program, unencumbered by foreign pressure and influence'. True to its form, the party also cites the presence of 'vast thorium deposits' which would form part of its 'consideration' when it decides on the 'Sethu-Samudram Channel' which might cut across the much revered yet mythical 'Ram Setu' in the Palk Strait

off Tamil Nadu. Close reading between the lines of the BJP manifesto suggests that the import of light water reactors from USA, Russia and France could be in for a major reassessment.

Yet there seems to be unanimity among most mainstream parties in accepting that India cannot abandon its pursuit of fission power; so the country's abiding love affair with the power of the atom remains steadfast.

Science does matter

While S&T may not form part of the daily vitriol that is spewed in election speeches, Indian scientists need not despair – at least among the 'big two' of the political spectrum, S&T does matter. The Indian National Congress in its manifesto may not have found enough space for S&T, but its leaders say they still believe in the sage advice of Jawaharlal Nehru who said 'it is science alone

that can solve the problems of hunger and poverty, of insanitation and illiteracy ... the future belongs to science and those who make friends with science.' But undoubtedly, the youth of today seeks to hear a more catchy tune; hence the BJP manifesto which has the stamp of the physicist from Allahabad University, Murli Manohar Joshi, Chairman of its Manifesto Committee boldly states 'India innovates and India leads'.

Manifestos by political parties indeed have to be taken seriously. In 1998, those who did not take the BJP manifesto with all its seriousness were taken aback when on 11 and 13 May 1998, India exploded a series of nuclear bombs and declared itself a 'nuclear weapons state'. In Chapter 8 of its 1998 manifesto, the BJP had written '[it would] Re-evaluate the country's nuclear policy and exercise the option to induct nuclear weapons.' Unfortunately most had not bothered to read the fine print of the manifesto.

But when finally the dust settles, undoubtedly the true winners in the highly charged 2014 elections are the voters who cast their ballots on the crowning glory of Indian S&T the simple brief case sized EVM that has become the hallmark of clean and fair elections. The dance of the Indian democracy truly powered by far reaching Indian frugal innovations!

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The inclusion of science in election manifestos

The guest editorial 'Science and the missing manifestos'¹ talks about the absence of inclusion of science, technology, environment, agriculture and medicine (STEAM) in election manifestos of various political parties aspiring to get elected in the general elections of 2014 in India. However, the guest editorial does not do justice to the manifestos, and falters on the homework on various aspects discussed therein.

The absence of a comparison on STEAM in one of the leading newspapers mentioned by Balasubramanian¹ does not mean that the manifestos lack a description of the same. At least two leading political parties aspiring to form the next government at the national level have clear science and technology (S&T) policy (note that in S&T, I have included STEAM). One of them aspires to increase the S&T budget to 2% of the national GDP. Another party intends to establish an intellectual property repository and rural technology institutions. Needless to say, these manifestos are drafted by intellectuals and perhaps we should treat them with respect.

Most importantly, India is considered a food adequate country (although it is

debatable whether this food is available to all equally). This has important implications in the shift in economic policy 'from a gamble in monsoon to a gamble in the market'². Balasubramanian¹ further adds that no words have been mentioned with regard to agriculture and that the seeds for development in this direction were sown in 1950s; whence I should like to push the date to 1920s (ref. 3). However, immediately upon attaining independence, India was busy undoing what the British had done⁴. In this process, we not only pushed ourselves back scientifically but economically as well. Perhaps independence in the present context is best defined as a change of governance from the British crown to Indian political parties.

However, what needs to be the prerogative of policy advisors is that we have constituencies like Malkajgiri, Ranga Reddy District dubbed the largest constituency in the country. Malkajgiri has a total electorate of approximately three million voters and elects one Member of Parliament. On the contrary, New Zealand has a population of four million⁵ and elects 70 representatives; thereby hangs a tale.

In addition to what is mentioned here and in the guest editorial¹, abandonment of manifestos by political parties is even more worrisome. This has its basis in the observation that a number of political parties have pre-poll alliances with more post-poll alliances in the offing. This attitude is not healthy in the long run for S&T in general, and for the nation in particular.

1. Balasubramanian, D., *Curr. Sci.*, 2014, **106**, 1047–1048.
2. Swaminathan, M. S., *Curr. Sci.*, 2003, **85**(7), 886–895.
3. C. N. A., *Curr. Sci.*, 1939, **8**(03), 141–142.
4. Shashi Kant and Berry, R. A. (eds), *Institutions, Sustainability and Natural Resources Sustainability, Economics and Natural Resources*, Springer, The Netherlands, 2005, vol. 2, pp. 83–113.
5. *The Little Data Book*, The World Bank, Washington DC, USA, 2007.

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