How Much Of ‘Science Controversies’ Are Actually About Science?

Never has scientific enterprise been challenged so much as it has been in present times. From the 1960s onwards, many major scientific and technological developments have been challenged, not only for their authenticity, but also on whether they match up to the political standards of acceptability. Karl Marx said that no scientific advancement is admirable unless it grants social justice to all, particularly the downtrodden and the labourers. This maxim has been the basis for some wholly unscientific global debates on the utility and safety of adopting certain technologies. In fact, since most modern technologies have been invented in the West, anti-technology protesters have coined the phrase “techno-imperialism” and “techno-colonialism”. Activists have gone even so far as to create what is referred to as “parallel science” to challenge the entire field of scientific enterprise as we know it.

Scientific facts or theories are usually based on a body of empirical research which are verifiable and reproducible. It sometimes takes decades to establish scientific truths and then get them into textbooks. It is a deliberately slow process with special reference to verification by a variety of peers. More importantly, science demands transparency and rigour. It is this process that is now being upended by certain groups of people.

And it is not only the left-liberal hoards who are anti-science.

In most countries, the bulk of the funding for science comes from governments, which are controlled by politicians, who are under the constant influence of different kinds of constituents and lobbyists. This is a choke point for the progress of science. In the United States, usually, modern science is contested by the Republicans, who try to stifle funding. When the Democrats are in power, they strongly promote science by giving a free hand to scientists. The latest challenger to the scientific establishment in the US is the one-year-old Donald Trump administration. One glaring example is Trump’s withdrawal from the Paris Convention on the environment, based purely on political considerations.

Trump’s Environmental Protection Agency (EPA) chief Scott Pruitt has replaced the agency’s entire science advisory panel with scientists from the industry which the EPA regulates. When there is clear scientific evidence that global warming is largely due to human activities, his appointees say that impacts of human activities cannot be accurately measured, and so, all public policies on the environment need not take into account climate change. Pruitt falsely declared that global warming stopped more than a decade ago, and his boss has recently quipped that the eastern shore of the US is so cold that it would be nice to have some global warming there.

When the leader of a scientifically and technologically advanced country like the US spouts such nonsense, politicians in many other countries can surely follow suit, and not support any public policy implementation to contain and reduce global warming. In some years time, these scientifically illiterate politicians won’t be around to be held accountable, and by then, the condition of the planet might have reached a point of no return.

The easiest way to undermine science is to demand that it be “sound science”. It begs the question as to how one can make science “sound”. Sound science can only emerge amongst critical scientists who can discuss

all the pros and cons. But if non-scientists who do not — and do not want to — understand the subtleties of scientific principles, dive into the debate, and refuse to accept the voice of the scientist, and even go as far as propping up some other so-called scientists to challenge mainstream science, it results in endless debates such as the ones surrounding nuclear energy, genetic engineering, climate science, biotechnology and many other modern therapeutic interventions.

The worthies who shout for “sound science” are challenging “open science” — the format that has developed over the past few centuries for authentic scientific research. And the “sound science” challengers are very clever, because they use the self-same principles of open science: that science must be transparent; results must be openly shared; methodologies must be rigorous.

The difference is this: “open science” strives to achieve more reliable science; “sound science” pushes to amplify uncertainty, create doubt and undermine scientific discoveries that are inimical to certain ideologies. Steven Goodman at the Meta-Research Center at Stanford University says that the open science movement critiques science to make it better, whereas the sound science movement tries to devalue the scientific approach itself. It is worthwhile to remember that most proponents of “sound science” are funded by vested interests, and for them to have continued funding for their activities (read survival), they would like these questions unresolved from here to eternity.

The term “sound science” was adopted by the US tobacco industry in the 1990s. The industry used the phrase to start a movement against an EPA report that secondary smoke causes cancer, to forestall efforts of state, local and regional governments to ban or curtail the sale of cigarettes. The “sound science” tactic attacks the fundamentally agreed principle that

science does not produce certainty but raises more questions. Scientists know that scientific research is always a “work in progress”, and it will never be finished. Science is not a magic wand that instantly establishes the truth. Science progressively narrows down the problem until such time that a totally watertight cause-and-effect relationship can be established.

The tobacco industry misused the tentativeness of scientific conclusions to upend scientific enterprise itself. The industry in fact proudly said that “doubt” is their product, and it is the best way to fight a “body of scientific facts”. Stanford historian Robert Proctor says that doubt in science has brilliantly served as a playbook for certain industries and anti-technology activists to create controversies and keep the pot boiling.

The idea of instilling uncertainty is not confined to tobacco. The Petroleum Institute, and energy giants like Chevron and Exxon-Mobil are equal culprits, for trying to ensure that their activities are not linked to climate change. Many pesticides companies have done the same for the fear of their products getting banned. Merchants of doubt are peddling their ideas all over the place, and there are more and more gullible recruits being drafted to join their anti-science movement. By demanding more studies, they delay the deployment of technologies, hurt progress, and the people who can benefit from them.

The US stealthily passed a Data Quality Act (Information Quality Act) at the lobbying of industry in 2000. The rule mandates that all federal agencies that disseminate information and data must comply with “quality, objectivity, utility, and integrity of information” that they disseminate. The public is allowed to challenge any information or data it deems to be inaccurate, or disagrees with. There is a new act in the making by Representative Lamar Smith of Texas, called the Honest Act, that will be used as a Trojan horse.

The Honest Act is designed to severely curtail EPA's ability to use data from certain studies.

According to Brain Nosek, executive director of Center for Open Science, there is no perfect study in science; "perfect science" is a wron notion. But opponents of science exploit this idea that science is not fully definitive, because they don't want policy makers to use the best available scientific evidence to make decisions.

These arguments are also being used by regulatory agencies. Thus, they unwittingly become anti-progress and ill-serve humanity.

There is no other better example of this, than the way the European Union (EU) uses the "precautionary principle" to curtail technological deployment like genetically modified (GM) crops. The EU interpretation of the precautionary principle is to demand absolute iron-clad guarantees that GM crops will be safe for all time to come. Had this logic been used for the purpose of using "fire" when our ancestors first tamed it, humankind could not have had all the benefits it has enjoyed throughout evolution. That is how silly the argument has become.

If only Dr Manmohan Singh had shown as much courage in the case of GM crops as he did when attacking the Kudankulam anti-nuclear activists. GM crops technology would have then blossomed in India by now for the benefit of its farmers. But that was not to be. The Narendra Modi government has turned out to be no different.

These controversies are rarely about the science itself. They are about a clash of ideologies and worldviews of people on how they want to shape the future of this world. Objective knowledge is not sufficient for resolving environmental controversies, believes Michael Carolan of the Colorado

State University. He says that underneath the superficial cause of the controversy — science, lie values that lead to different understandings of facts. He recommends that different stakeholders need to put on the table their value systems, so that we can resolve the issues in a fully informed manner. Otherwise, attempts to settle scientific controversies between differing groups will be futile. According to Naomi Oreskes, author of Merchants of Doubt, these controversies are actually political debates. It is a waste of time to attack the cherry-picked science that is trotted to support each other’s point of view. What is needed in addition to doing transparent and rigorous science is to assess the real motive behind each stakeholder’s arguments.

Decisions on scientific and technological issues must rest with acknowledged scientific experts. The only way a science-based public policy decision can be made is by employing the “scientific consensus” of the day. The best institutions that can provide scientific consensus are the nation’s scientific academies, which, in the case of India, have done a commendable job. But the political establishment does not seem to care for the advice of the nation’s scientific bodies, which is a sad commentary on the governance of the country. If scientific consensus is not taken on board, there will be no end to the useless debates that continue to dog progress.