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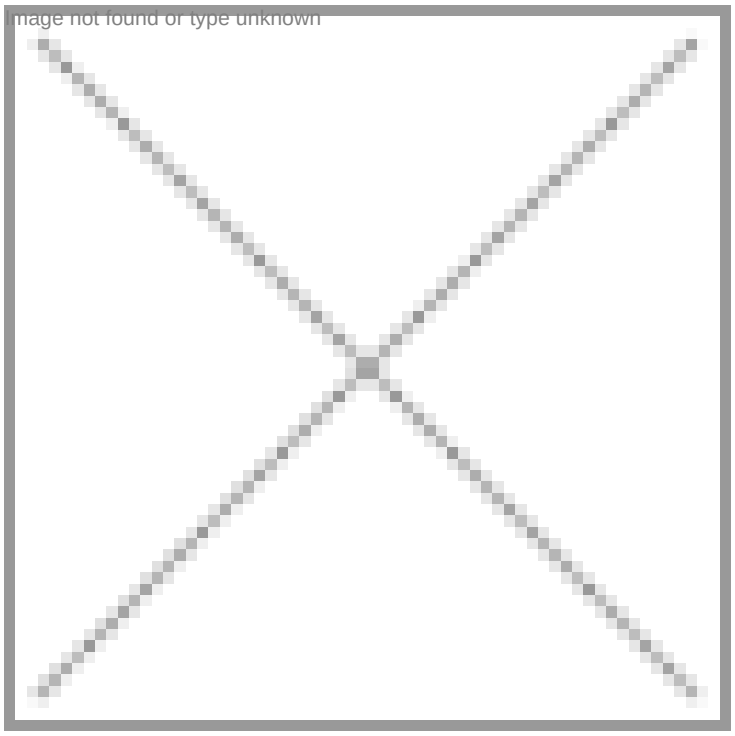

Scientific community must not yield to Luddites this time

Nano biotechnology and synthetic biology can solve many of the intransigent problems of our society. Science and technology development should not be stopped because of political demagogues

"DNA neither cares nor knows. DNA just is. And, we dance to its music."
-Richard Dawkins

It seems it is always the anti-technology activists who are first to cast their stone at any new technology, and scientists come later. Ottawa-based ETC has fired the first salvo demanding stringent regulatory restrictions on the development of nanobiotechnology and synthetic biology. Undoing PR damage is always a hopeless effort afterwards as we have learnt from the GM crops example. As the anti-GMO campaign rages on in India and around the world, the same Luddites are starting to open a new battlefront to stop newer technologies like nanobiotechnolgy and synthetic biology. In fact, it is not in their best interest to learn facts and truth about science and biotechnology. They are just waiting for their masters in Europe to give them a call. It would not be too long before they start their "Free India of Synthetic Biology and Nanobiotechnology" campaign. Right now, they are too busily entrenched in the anti-GMO warfare. They just want to keep the pot stirred by making loudest noise possible so that authorities start clamping down on them, and choke them to death.

Pseudo solutions

Slogans against nanobiotechnology and synthetic biology are still the same old worn out and clichÃ©d that they were against GMOs â€“ scientists do not know what they are doing; they have no idea about the long-term consequences of these technologies; these technologies will not help the poor, lots of imaginary ethical concerns, and worse private corporations will make usurious profits by hoisting new technology products on the unsuspecting public when we really do not need all these techno-fixes for problems in our society. They want all scientists and companies to become philanthropic, and share their knowledge and skills for the greater good of the humanity without returns. Sounds like socialistic Utopia. You got it right. Remember all these NGOs are fully paid members of the World Social Forum (WSF), the anti-thesis of World Economic Forum (WEF) and the World Trade Organization (WTO).

The scientific community around the world was caught napping when the anti-GMO movement started. When some of us woke them up from the slumber, they simply waved their hands, and said "Oh! Do not worry. All this fussers will go away." However, the antis did not as we can see today. They are all well heeled, deeply entrenched, organized, and will fight to the bitter end. They are now a multi-million dollar, multi-national protest industry, no different from a multi-national corporation. The European Luddites have done everything possible to drive the biotech industry out of Europe whereas North America merrily went on to innovate and created a multi-billion dollar biotechnology industry creating job opportunities, economic growth, and become a world leader. The Indian Luddites drawing inspiration from their European brethren are doing everything possible to kill biotech development and take the country backwards to organic agriculture, systems rice intensification (SRI), and natural farming, whatever these mean to them. One of the Luddites in India said that Indian agriculture needs be "re-ruralized," meaning going back to pre-green revolution days. Why do anti-technology activists hate modern science and technology? Their motto is very simple. If it is made in the US, and if it is good for America, then it must be bad for us and bad for our poor people. Therefore, throw the baby along with the bath water. The Indian Luddites are so desperate that they are willing cut their nose to spite their face. For them, even an indigenously developed GM crop is no good. See, they have to come across as objective. Indian Luddites have not still caught on to nanotechnology and synthetic biology bandwagon, perhaps because they just do not know what these two new beasts are.

Not that it has bothered them before just because they do not understand science. I hope this article does not give them ideas. Nevertheless, again the lack of any understanding of science and technology has not stopped them before. They must be waiting for a European sponsor to hand them the relay baton to start crying hoarse here.

The scientific community should not lose the opportunity this time to take the lead and to educate politicians, policy makers about nanotechnology and synthetic biology to see that these new disciplines are brought to bear on India's development. There are some select centers in India doing excellent basic research in nanobiotechnolgy and synthetic biology, and they should be encouraged. At the same time, Indian academies of science must start producing white papers on these technologies to inform the public, government, and media about the risks and benefits of these new technologies, and create a favorable public opinion for the development of these newer technologies.

Potential of newer technologies

Synthetic biology is a pioneering field of new biology in which sub-cellular components and molecules can be assembled to create designer life forms for useful purposes. In one sense, synthetic biology is as old as synthetic chemistry. In fact, chemists who started understanding the structure and function of biomolecules started synthetic biology. Dr Hargobind Khorana got his Nobel Prize precisely for synthesizing polynucleotides (DNA) in a test tube, which paved the way for a flourishing nucleic acid synthesis industry. Scientists have been synthesizing or semi-synthesizing many macromolecules like proteins, carbohydrates and antibiotics for along, and these processes have helped enormously to bring down the costs of chemicals and drugs. Synthetic biology promises to do the same. Dr Craig Venter, a pioneer in this field recently appeared on several TV talk shows in the US and "Hard Talk" on BBC explaining synthetic biology and its potential uses. Smart TV talk show hosts grilled him with questions about environmental, public health impacts, and ethical concerns of synthetic biology and he gave convincing answers to lay those concerns to rest. His new book, "A life Decoded; My Genome; My Life" is a wonderful read for all interested in future of modern biology. Craig Venter is not just interested in understanding how life works, but he is trying to make it work for human beings. To a criticism that scientists are playing God, Dr Venter said a brilliant thing. He said he would like to excel God in playing God as the benevolent God we all know has made some horrible mistakes in creating life forms, and he would like to correct them. Asking hard-nosed questions about the safety, utility, risks, benefits, and being concerned about socio-economic impacts are all normal, and everyone should collaborate in such an exercise, and find appropriate grounds for benefiting from this technology. However, demanding total stoppage of the technological development is clearly out of place. The more sinister thing is to scare the public without any basic understanding of the technology just to kill technological development on some political agenda as if techno-imperialism is a crime against humanity. Science and technology waits for none. If India is held back because of anti-technology activism, it is only the Indians who are going to suffer, but not the urban Luddites who have carved out a nice life for them anyways.

Nanobiotechnology and synthetic biology have so much of potential benefits to offer, and can solve many of the intransigent problems of our society. It is not unimaginable to synthesize organisms that can remove excess carbon dioxide from the atmosphere, clean up pollutants in soil and water much more efficiently than hitherto before. The biggest hope for synthetic biology is to design organisms for bioenergy production in a cost effective and efficient manner. These may sound like dreams, but remember GMO was also a dream not too long ago. Science and technology development should not be stopped because of political demagogues.

Need for initiatives by scientists

Nanotechnology is once again not a brand new science that has not been seen before. It is just a new fancy name for methods and processes that are carried out at sub-micron level. It goes further than that and can get very sophisticated. Application of nanotechnology can be endless. Nanotechnology combines physics, mathematics, chemistry, and biology to find applications in medicine and agriculture and environmental protection. Dr Anita Goel, a 34-year-old MIT scientist of Indian origin is making headlines in the US in the field of nanobiotechnolgy and it is wonderful to see such brilliant young minds achieve such laurels, and they can all be helpful to India's growth in modern technologies. She is already helping Himachal Pradesh to set up a biotech park in Solan. India needs to create and nurture such young minds in a creative atmosphere for the benefit of its people. May her tribe flourish.

UK's Royal Society has taken the lead by releasing a report on nanotechnology in which it asked for a science based assessment, which is the right thing to do. Every stakeholder must take part in a comprehensive assessment, and then decide priorities for proper technological development. No one technology is a panacea for all our problems, but there is no doubt that all of them when used appropriately can benefit the society. If the scientific community in developing countries does not take this matter seriously, the Luddites will have a free reign again, and there is no telling where this will all end up.

Whenever scientists have spoken in strong terms, the controversies have subsided quite fast. The best example of that in India was when a paper by Kranti et al in Current Science on differential expression of Bt gene in Bt cotton was erroneously bandied about as the best scientific evidence for alleged Bt cotton failures in the country. Mercifully, the scientist Kranti took effective steps by writing in The Hindu to put an end the scientific nonsense that the Luddites were propagating. It is another thing that Bt cotton is a hands down winner in India, and has overtaken China in GM cotton area. However, the shameless Luddites will concede an inch on this score. The Indian scientific community must develop a stake in India's science and technology development, and never let scientific ignoramuses, and wanton "mischief makers" with scientific credentials to hijack the science and technology agenda. India needs all the science and technology it can muster for its development and more, and not endless controversies, and debates by the Luddites.

Scientists must take the initiative to reach out to the public through media and build confidence in science and technology. Even though, nanotechnology and synthetic biology are seemingly young and promising, they should not be allowed to become a victim of the Luddite shenanigans. India has so many scientific academies and scientific associations and

societies. They all have to come out with a white paper on all emerging technologies, scientific pursuit, and advise the government, courts, and the media to place the proper facts before the public. Otherwise, who knows how many more cattle, sheep, donkeys, pigs, and chickens will die because of nanotechnology and synthetic biology? If only the Agricultural Sciences Academy of India or the Indian National Science Academy had filed a friend of the court brief against all the nonsensical court cases against GM crops, those cases could have been dismissed out of hand.