

Science, scientists and society*

The Indian Academy of Sciences (IASc) is launching a new journal called 'Dialogue: Science, Scientists and Society' from January 2018. In this connection a symposium was organized recently. Ram Ramaswamy (President, IASc) in his opening remarks, mentioned that the Academy intends to expand the scope of some of its formal activities with the launch of this new journal. He indicated the need for a proper forum for discussing and disseminating scholarly articles and reports on public policy matters that concern science and technology. He also mentioned that there is public demand and need for scientists in the country and Academies in particular, to speak out on many issues that concern ordinary citizens. Ramaswamy indicated that although journals such as *Current Science*, *Journal of Scientific Temper*, *Economic and Political Weekly* do publish on many issues and deal with diverse topics concerning science and society, they are not exclusively devoted to the science-society interface. He hoped that the establishment of an on-line, scholarly, peer-reviewed, interdisciplinary journal such as *Dialogue*, would be jointly supported by all scientific bodies and science academies in the country.

Mewa Singh (Editor, *Dialogue*) said that *Dialogue* would focus on three themes, namely (i) practice of science, (ii) communication of science, and (iii) impact of science on society and shaping of science by society and culture. In addition to the main theme, several related themes such as gender, science policy, science education, science funding, etc. would be discussed in the journal. The journal would be interested in themes that are set in the Indian context, but would also be open to global issues. He mentioned that it would be a broad platform for people to interact, share their views and discuss issues. Along with *Dialogue*, a web forum called 'Confluence' will be kept open for informal dis-

cussions. *Dialogue* envisages having a number of outreach programmes.

Roddam Narasimha (Jawaharlal Nehru Centre for Advanced Scientific Research) in his talk on 'Science, Society and State – do they have mutual obligations?', congratulated the Academy on the initiative taken for conceiving the new journal. He mentioned that there indeed are mutual obligations between science, society and state. He drew attention to the fact that the assessment of educational institutions has been primarily publications-oriented, i.e. the number of papers written and of citations received. While this is important, he felt that other criteria such as success in translational research and innovation ought to receive more attention. In addition scientists must realize that they are obligated to state and society in helping boost the economy. Scientists working at the expense of state/society must be able to explain to society, why and what they are doing. Narasimha mentioned that one of the greatest obligations that the state has towards science is to make sure that all areas of science are supported. With regard to the obligation of society to science, he mentioned that it is important for society to see the benefits of science and be able to acquire a more scientific and rational view. This kind of appreciation and change of overall view would be expected as an obligation of society to science.

P. Balaram (Indian Institute of Science) gave a talk on 'Science communication: shaping the public perception of science'. He cited surveys that have normally found a variation in the perceptions of practising scientists and the general public. Highlighting the importance of written communication, he also talked about the need to read and study styles in order to write well. Giving several examples, he spoke about the popularization of science, problems in popularizing subjects that are difficult to communicate, fundamental research versus use-inspired research, importance of public understanding of science and public engagement. He mentioned that fantasies and myths across cultures have driven modern civilization to the point at which

it is today. There is tension arising from the traditional view of civilization and the scientists' view of the world around us. That is where the conflict lies and where public understanding of science becomes important.

Mukund Thattai (National Centre for Biological Sciences) focused on the public engagement roadmap for science. He indicated that scientists are first and foremost members of society, who need to open up conversation with the public, convey their work and convince the public as to why it matters. Of late, communication by scientists has become fairly good. However, he felt that scientists also need to start listening to the public. Communication, popularization and outreach are being done by most scientists these days. However, he emphasized that engagement, dialogue and advocacy are the space that scientists need to engage in and a journal of such nature would help in this initiative. He mentioned that the aspects such as communication, science journalism, popularization and outreach should not be self-serving and that scientists should be doing something more, like communicating with social scientists to generate new ways of thinking or re-imagining science in the form of art-science. Work such as art-science is not directly beneficial to the scientists; it is not directly supported by the institutional framework, but enables a deeper appreciation and understanding of science. Unlike the formal science forums, what is required is a neutral space where artists, scientists and members of the public can have a sustained interaction.

Seema Singh (*The Ken*, Digital Publications, Bengaluru) dwelt on renewed advocacy of basic, applied and translational science. Similar to the economic narrative of the country, she felt that there is need for a narrative or general perception of science or a repository where one can find such information. In the case of the new journal, she cautioned that there is no one size fit for all communication, as the journal would be consumed by different layers of people in the society. Singh also cautioned that the journal could move from a state of no communication to excess communication.

*A report on the symposium: Dialogue – Science, Scientists and Society. It was organized on 13 October 2017 at the Indian Institute of Science, Bengaluru.

During this stage there would be huge pressure on the digital world to present more content cheaply and quickly, and it is important that the journal does not succumb to such pressures.

Sundar Sarukkai (National Institute of Advanced Studies) raised questions as to who should really be talking about science and society, and what skills or professional training one needs for the same. He mentioned that scientists, though important, did not have the final authority to speak on science and society, and as partners, needed to draw upon professionally trained historians, philosophers

and sociologists. Such trained professionals are hard to find in India, as the country does not have a full-fledged programme in the history, philosophy and sociology of science. He urged that science education should be a broadened study of science through history, philosophy and sociology of science.

Shiv Visvanathan (Jindal Global Law School) emphasized the need for democracy within the scientific community, conversations between scientists and science policy makers as well as between scientists as citizens and other citizens. He felt that the dialogue with people

needed to improve further. He urged scientists to use science to provide a more imaginative democracy and invited them to experiment within the democratic imagination.

In his concluding remarks, Ramaswamy hoped that the journal would see multiplicity in opinions, debates and serious engagement on important matters.

S. Priya (*S. Ramaseshan Fellow*), Current Science Association, Bengaluru 560 080, India.
e-mail: priya@ias.ac.in

MEETING REPORT

Environmental safeguards*

A workshop was organized recently in North East (NE) Region of India to review the implementation status of environmental safeguards mentioned in the environmental clearance letter for oil, petroleum and gas-based projects.

The discussion was organized as part of the mandate of the Regional Office, Shillong with the objective to achieve better coordination between the regulators, the projects and R&D institutes through discussion and interaction. Therefore, regulatory authorities and R&D organizations were invited for a deliberation on environment management, pollution control, resource and energy conservation, clean production and R&D needs, thereby benefiting the industry with respect to technological innovations in this sector and involvement of R&D organizations in the form of industry-institution joint collaborative programmes for the NE region of the country.

B. S. Kharmawphlang (Chief Controller of Forests (Central), Shillong) welcomed the delegates and emphasized the need for a proper dialogue between the regulating agencies and the project executors, so that the projects would be

informed about changes in the guidelines. Development and compliance must go hand in hand. However in most cases, compliance checks are not followed-up and therefore there is need for such an interactive session, which would help in achieving excellence and benefit the stakeholders.

V. P. Upadhyay (MoEF) projected the uniqueness of the petroleum industry in our everyday life. It is the largest money earning industry, diverse in both products and pollutants, similar to coal industry. He highlighted the pollution issues in drilling, production, combustion of by-products as a result of flaring, production water containing dissolved and emulsified crude oil constituents, natural salts, organic chemicals and trace metals, solid wastes comprising drill cuttings and drilling fluid mud, oil spills, noise and exhaust gases from diesel engines and power generation sets. He underlined the importance of leachate collection system in the disposal of drill cuttings and drilling fluids originating from on-shore locations, which is not available at the project sites. According to the guidelines related to drill cuttings and drilling fluids for on-shore Installations (2005), only water-based mud is permitted for drilling; oil-based mud with low toxicity may be permitted only in special cases; chemical additives used in drilling fluid should be biodegradable and have low toxicity; chemicals should be biodegradable, waste pit should be covered with

1.5 mm thick liner and native soil, with proper slope, with the design of the waste pit and capping being approved by regulators like the Pollution Control Board. Upadhyay also mentioned that the projects have not made any inventories on the number of abandoned sites which have been restored or are yet to be reclaimed. He advised the project authorities to seek help from R&D institutes such as Rain Forest Research Institute (RFRI), Jorhat for reclamation or restoration process.

According to Upadhyay, there are three important aspects in respect of oil refineries: minimizing emissions, minimizing wastewater, and solid waste management. The oil zapper is being used at present for remediation of oil sludge from the industries. He requested the project authorities to let the Regional Office know about the end use and quality of the remediated oil sludge-contaminated habitat. The projects should support the NE institutes to carry out further research for alternative and better solutions than oil zapper to restore the fertility of abandoned sites. He emphasized further processing of petroleum coke, only by large-scale industries with proper pollution control systems. Petroleum coke should be sold to those industries which have proper Environmental Clearance (EC) (if applicable) and consent to operate. Oil refining and petrochemical projects generate solid wastes and sludge, some of which are hazardous

*A report on the 'Workshop on Environmental Compliance in Oil, Petroleum and Gas-based Projects of the North East Region' held on 24 March 2017 at the Regional Office, Ministry of Environment, Forest and Climate Change, Shillong.