Brainstorming on public risk perception*

Risk is defined as 'a chance or possibility of danger, loss, injury, or other adverse consequences' (*The Concise Oxford Dictionary*). A brainstorming session held recently addressed the factors on which the perception of risk depends and the evolution of a methodology for public debate on critical issues facing the country. The focus was on five topics, namely alcohol, cell phones, genetically modified (GM) crops, climate change and nuclear power.

V. S. Ramamurthy (National Institute of Advanced Studies (NIAS), Bangalore) expressed worry on the distress voiced on public policies. In every decision taken in a democracy, the public are the stakeholders and decision-makers; but they are not specialists. People do not know how to ask the right questions and specialists do not know how to give the right answers. The magnitudes of the risk conveyed by specialists and the public responses usually do not correlate. Ramamurthy explained that risk perception may involve personal biases, illogical beliefs and superstitions. It is also sociological and cultural.

Sangeetha Menon (NIAS) conveyed that our perception of risk, and risk-aversion and risk-taking tendencies are determined by our 'sense of security'; this is the sense of displacement (or its absence), of losing (or not), and being (or not) in control, and is a fundamental factor in differentiating between a 'feeling' about risk and the 'actual' risk. She also highlighted the effect of desires, biases, fear of the unknown and individual versus group in decision-making.

Malavika Kapur (NIAS) spoke of relevant work by Karl Jaspers (e.g. blinkers or prejudices that prevent one from seeing an event as it should be seen) and Sigmund Freud (e.g. unconscious defence mechanisms such as repression and projection), and about empathy and bystander apathy (keeping a distance between oneself and others as a risk avoidance measure) in group situations. She suggested that one could decrease the distance between the risk producer and the unwitting risk taker (victim) by embedding empathy in the mediating process.

M. G. Narasimhan (NIAS) discussed bridging the gap between risk perceptions of the professional and the layperson through risk communication; the role of 'expertise' and 'trust', and a new model which justifies the complexity of risk communication involving interaction and interest groups. He highlighted that risk communication is a continuous process, a dynamic interactive exchange of information and opinion, and involves not only the scientific (assessed/measured) risks, but also perceived risks and possible risk-related factors.

According to Vivek Benegal (National Institute of Mental Health and Neuro Sciences (NIMHANS), Bangalore) alcoholism has a low public risk perception, even if it causes as much mortality as drinking water and sanitation problems. He presented data from a survey conducted on Indian adults. The survey shows that among the 25% of Indian males who consume alcohol, 5% are alcohol-dependant (addicts) and the remaining 20% suffer harmful consequences of alcohol consumption. He said that treatments however focus only on the 5% addicts. He suggested that conveying a personalized message to an alcohol addict is more effective than an 'alcohol is bad' campaign.

The recent announcement of the WHO's International Agency for Research on Cancer, that radiofrequency electromagnetic fields are 'possibly carcinogenic to humans' (http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf), received mixed reactions from the public. Though the ill-effects of cell phone usage have been speculated upon for long, no studies conducted thus far suggest with substantial evidence that cancers are caused by cell phone use. But, patients who have undergone brain tumour surgery are advised not to use a cell phone post-surgery. According to Vani Santosh (NIMHANS): 'This is a precaution prescribed by doctors as cell phone radiations could trigger a secondary tumour.'

Nagesh Hegde (freelance journalist), having worked as a media person for over a decade observing the system from within, said that the media 'takes special interest in blowing up images such as those in the *Bt* brinjal debate'. He identified ten issues of concern surrounding the debate on GM food crops, opposed strongly in India. M. Mahadevappa (former Vice-Chancellor, University of Agricultural Sciences, Dharwad) held the view that every new technology is opposed initially; this is true of genetic engineering technology as well. He emphasized on the need for the scientific community to educate farmers and the public.

Dilip R. Ahuja (NIAS) touched upon another controversial topic – the public perception of climate change, referring to it as 'a serious problem'. He presented results from a survey conducted under the Pew Research Center's Global Attitudes Project. Between 2009 and 2010, the decline in belief that climate change is a serious problem, fell by 5% in India; the highest decline has been observed in the neighbouring country, Pakistan (28%) during the same period. In India, the media seems to have drawn attention to climate change by publishing stories on glaciers and polar bears, in the years leading up to Copenhagen. Now the media has lost interest in the issue. Ahuja mentioned that just to be objective in its coverage, the media gives equal space to the opinion of the 97–98% of actively publishing climate scientists who believe that climate change is happening[1] and the remaining 2–3% climate-change sceptics.

K. Ravi Srinivas (Research and Information System for Developing Countries, New Delhi) talked about the public perception of risks associated with carbon capture and storage technology for climate change mitigation. He said that the common man is not clear about the technology because the NGO community is divided into one group that accepts the technology with caution and the other that rejects it altogether.

*A report on the brainstorming session on public risk perception held at and organized by the National Institute of Advanced Studies, Bangalore, during 29−30 September 2011.

The perception of danger in nuclear energy started in the 1970s and the perception of risk started with it, said K. S. Parthasarathy (Department of Atomic Energy, Mumbai). He pointed out that knowledge about nuclear energy is poor and fear is extraordinarily high, which has been amplified by the attitude of secrecy and consequent creation of mistrust. He discussed the myths and realities related to nuclear waste management, accidents and proliferation, atomic bombs, terrorism and biological effects. For example, persons living in areas with high background radiation or high radon levels would receive higher radiation doses than the average dose to nuclear power plant workers, and these two types of radiation (natural and man-made) are exactly the same.

Atul H. Chokshi (Indian Institute of Science, Bangalore) stressed that the links between science, society and public policy should be strengthened. He brought up nuclear-related issues such as the track record of broken promises, science being driven not only by natural curiosity but also by financial culture and inducement, the increasing specialization in science along with greater public awareness and trust deficit, the influence of nuclear accidents on public perception, premature announcement of nuclear safety by many governments post-Fukushima, the subjective nature of 'scientific' cost–benefit analyses, and the human development index as a better assessor of progress than GDP.

The brainstorming session focussed on suggesting a practical methodology for public debate on risk perception, assessment, communication and management. R. Rajaraman (Jawaharlal Nehru University, New Delhi) pointed out that there is no systematic discussion on these issues. He presented an ideal method starting from experts agreeing on facts; conveying a distilled message to the public; coming to a compromised viewpoint taking into account technical, economic and political factors; deciding whether to continue with the project, abandon it or delay it and communicating this to the affected public – before the project starts. Given that we do not live in a rational world, Rajaraman also highlighted the compromises that have to be made.

Some points which came up during this session were: (i) the public may not be forthcoming to meet the scientists; (ii) the scientific community does not communicate with the public as much as the activists; (iii) scientists need to be absolutely honest about what the state of their knowledge shows them, and then let the public decide; (iv) a consensus among scientists may not be possible, but they could say: 'we agree on these points; these issues need to be talked about …'; social scientists and others could be present during these discussions; (v) heterogeneity and the level of understanding of the audience should be kept in mind while communicating; (vi) how can we move the debate prior to decision-making? (vii) public demonstrations do not represent public opinion and (viii) referendums could be tried for major issues, but the outcome of referenda depends on how the questions are phrased.

The proceedings of the session incorporating full texts of lectures is to be brought out soon. For further information, contact Malavika Kapur at malavikakapur@yahoo.co.in

1. Anderegg, W. R. L. *et al.*, *Proc. Natl. Acad. Sci. USA*, 2010, **107**(27), 12107–12109.

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MEETING REPORT

Where are the conservationists?*

Biodiversity loss is occurring at an unprecedented rate. The rate of extinction of species worldwide is a thousand times higher than previously documented in 1997 by the International Union for Conservation of Nature (IUCN). According to the 2004 update of the IUCN Red List, 15,589 species are at risk of extinction. One in three amphibians, one in four mammals, one in five sharks and rays, one in eight birds and almost half of the turtles and tortoises are in danger. Habitat destruction, pollution, climate change, introduction of exotic species and disease pose threats to biodiversity at different scales. This is where conservation science comes into the picture. Conservation is an important aspect of biology and is essential for conserving genetic diversity and protecting species, habitats and ecosystems. This science is not restricted to reversing the decline of species and restoring degraded habitats, but includes protecting species.

To address the issues of species decline and various aspects of conservation, the Student Conference on Conservation Science (SCCS) was organized in Bangalore. This is a sister conference to SCCS-Cambridge and SCCS-New York. More than 200 participants from South and South-East Asia attended this conference. It provided a unique platform for young researchers, budding scientists and future conservationists to exchange ideas, present their work, redefine their concepts and develop contacts with the scientific community.

In his address, Leszek Borysiewicz (University of Cambridge (CAM), Cambridge) spoke about the simultaneous conferences at Cambridge and New York, and the need for conservation today for the benefit of future generations. The plenary talks covered the broad aspects and practical sides of conservation. Harry C. Biggs (South African National Parks, South Africa) discussed various adaptive management initiatives in response to variability, uncertainty and complexity that were successfully implemented in the Kruger National Park. Andrew Balmford (CAM) talked about species decline and conservation efforts in 'Nature's glass: half-full or half-empty?' and Yvonne Sadovy (The

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