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Role of mass media in crisis communication

Confluence of knowledge, wisdom and excellence in science

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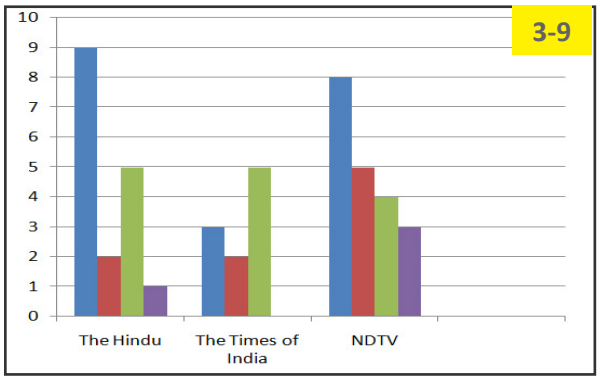

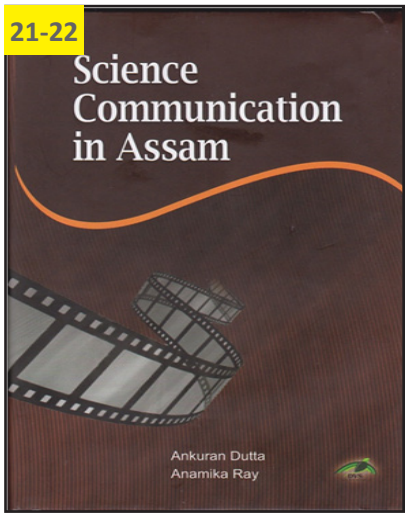

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A view of Lindau - the place of Meetings of the Nobel Laureates

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Paid science news: Compromising 'scientific validation' and 'journalistic scrutiny'

Generally, people tend to believe the so-called elite and enlightened class of the society for their wisdom and advice and look towards them for solutions of issues and aspects confronting to various facets of people's lives. Scientists and journalists, for example, are considered to fall in the same category of enlightened class of society. Unfortunately, like other areas of human activities, these two 'intellectuals' seem to have become victim of current trends of obscurities and uncertainties derived by increasing incidences of undue pressures from interested parties and lobby groups for taking sides, sometimes linked with certain gains too, thereby likely to lose public trust.

Recently, there has been lot of hues and cries for 'Paid News' in mass media across the world and 'paid science news' too cannot be seen in isolation. We need to examine the circumstances responsible for paid science news, views and features that appear in mass media, print, broadcast and online, while understanding thin lines between paid, sponsored, packaged, managed, imposed, cooked-up, and hypothetical scientific research and media stories, where internal or external sources are involved illegitimately in 'influencing' the 'research reports of scientists' or 'media reports of journalists' to serve someone's undue interest. The Department-Related Parliamentary Standing Committee presented its report on the "Issues Related to Paid News" in the Indian Parliament on May 6, 2013, headed by Rao Inderjit Singh, Member of Parliament, after the issues of paid news came to limelight and raised at various levels. Prior to that, the Press Council of India gave its report on 'Paid News' and defined paid news as 'any news or analysis appearing in print or electronic media for consideration in cash or kind' in its report of July 30, 2010. Following the exposure of widespread phone hacking by journalists in the U.K., an enquiry was announced to investigate the culture, practices and ethics of the press, chaired by Lord Justice Leveson; the report was published on November 29, 2012. All three independent reports recommend 'steps to curb paid news without state's control over media for want of freedom of speech'.

Media is considered to be the fourth estate of power especially in a democratic setup. Similarly, scientific research is also bestowed with tremendous powers to not only determine the progress of a nation but strength too in today's world scenario. The role of a scientist and journalist is more crucial especially for 'balanced science news' to appear in mass media and therefore emphasis on 'responsible science' and 'responsible journalism' would be decisive. Where scientists are paid to be lie in their research findings, journalists are paid to hide the truth in their media reports, and people are paid for beating a rival in science, media, or industry, could be couple of kinds of paid science news. The instances where 'someone financed problems for someone from someone' for 'good or bad publicity' in mass media can be bracketed under paid news.

The case for countries that are not blessed with the democracy is even worst. It is not only difficult to get 'balanced news' but also access it from outside the country is more cumbersome. If someone succeeds in doing so, who knows, whether the news is censored, biased or based on unlawful and unauthentic source paid-up by interested groups! A number of good aspects of paid science news are also noteworthy. Various scientific organizations have some budgetary provision for publicity, public relations, awareness, or organizational image building, etc. For example, conducting media tours of science establishments, study trips of scientific laboratories by journalists, organization of media briefings/ press conferences, press release, and inviting press parties for coverage of national and international events, etc., could be some of the examples of good aspects of paid science news. However, sometime it is interesting to note that scientific organization has covered entire costs for the trip of journalists for coverage and has taken care of all comfort and requirements of the group, but eventually the reports brought out criticism. Though, a healthy criticism is always desirable! On the other hand, here is an example, where journalistic scrutiny was compromised. A press officer of a research organization while praising a newspaper told that the newspaper publishes the entire press release issued by his organization. It may be cozy for the research organization, the scientists and the press officer, but it becomes quite obvious that the journalist then was not doing his job.

The primary function of media was to inform and educate public about the day-to-day happenings all around but now the primary function of media has become to sell audiences to advertisers. The media does not make money from subscriptions. Obviously the advertisers are not going to pay for a feature on health risks, environmental degradation or a discussion that encourages people to participate democratically in a developmental process and inculcate a scientific bent of mind.

At the same time, there are instances where scientists show unjustified biases that may require intense probing by journalists. Scientists hardly support the 'investigative' approach of the journalism, though the scientific approach attributed to be 'investigative'. The analysis suggests that a substantial number of medical research published in journals have financial links with pharmaceutical companies and conflict of interests motivates some researchers to project results favorable to these companies.The issue of increasing influence of commerce on scientific research and media coverage and problems arising thereof has been the focus of discussions at various forums recently that causes concerns the world over. Things have even reached the point where commercial compulsions are making fundamental changes in the way science is done and the way it is communicated. Obviously, those who are paying for it have the upper hand to sell their ideas and concepts to influence and rule our minds, to serve their undue interests, necessitating the need for a sixth sense for the audience!

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News media framing on Doha climate change conference

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The aim of this study was to explore articles on Doha Climate Change Conference from three online news media appeared between November 1st 2012 to December 9th 2012, in The Hindu, The Times of India, and New Delhi Television (NDTV). A content analysis was conducted and the results were examined and compared for various framing aspects of climate change issues, like attribution of responsibilities, human interest, conflict, and economic consequence. Overall, it was found that Doha Climate Change had a least coverage compared to the previous years. The Hindu and The NDTV had majority of the articles captured from the attribution of responsibility frame. The Hindu and The Times of India had equal frequency of articles in the human interest and conflict frame. Mortality frame did not occur in any of the articles.

Keywords: Doha climate change conference, News media framing, public perception, impact of media

Introduction

Rising global temperatures caused by anthropogenic sources, more commonly referred to as global warming or climate change is an alarming trend and a growing concern across much of the general population (IPCC, 2007). There are many negative implications for physical and biological systems worldwide associated with global warming. Some examples are: the increased severity of extreme weather events, the loss of Arctic and Antarctic snow and ice cover (which affects the tundra ecosystem), increased occurrences of coral bleaching and mortality due to increases in sea surface temperatures, and greater damage to coastal regions due to flooding and storms (IPCC, 2007).

Climate change is attracting increasing attention within India, and, in parallel, India is attracting increasing attention within the climate debate. This attention reflects both India's physical and political situation. Physically, the country's population of 1.03 billion, 70% of which still lives in rural areas, surviving largely on subsistence farming or labouring, as well as its location on the Himalayan-fed South-Asian mega-deltas, makes it highly vulnerable to the effects of climate change (Mawdsley 2004).

Although mounting evidence suggests that

humans are indeed contributing to anthropogenic climate change and that the consequences could be severe, there is an ongoing debate and uncertainty with many aspects of this issue. According to Heal and Kristrom (2002) there are three main areas of uncertainty with regard to climate change: in its impacts, in the scientific evidence and research, and in the present and future policies that will deal with this issue. The effects of anthropogenic climate change cannot be precisely predicted, and thus there is uncertainty in the rate at which its effects will be felt, and there is also the question as to whether or not the observed trends are simply a part of the natural fluctuations that are known to occur in the earth's climate (Reddy and Assenza, 2009).

There is a need for outlets that will relay information about climate change and solutions to policy makers and the public, so that these parties are aware of the effects and possible effects of climate change. Given sufficient accurate information, policy makers and the public should be able to take appropriate actions to counteract any detrimental outcomes as a result of climate change (McCombs and Shaw, 1972).

The news media are an important means of communicating such information. A great deal of research has been conducted to date in an effort to determine how the media affect policy agendas and public opinions. As Liu et al. (2008) observe, the media usually have one of two functions in influencing public and policy agenda setting: influencing salience and influencing views. Several studies have studied the role of the news media in influencing salience, the results of which indicate that media do affect the salience of issues amongst the public .Media agenda setting studies have shown that the news media can influence the way that the public and policymakers view the issues, for example, either negatively or positively (McCombs and Shaw, 1972).

Climate change and media

Media likely play an important role in the public's perception of climate change risks by generalizing personal experiences and by framing them in specific ways (McComas and Shanahan, 1999). There are several aspects of anthropogenic climate change and the media that have been studied to date. Many studies have dealt with themes, framing and values of climate change within the news media. A frame is a thematic unit that Tankard (2001, pp. 100–101) defines as ''a central organizing idea for news content that supplies a context and suggests what the issue is through the use of selection, emphasis, exclusion, and elaboration''.

Boykoff (2008b) investigated climate change articles from four tabloid newspapers in the United Kingdom over the period from 2000 to 2006 via a critical discourse analysis, semi-structured interviews and a framing investigation. The results show that the tabloids mainly frame climate change using weather events, biological species that have wide public appeal, the actions of politicians and other policy makers and relatively few articles centered on climate justice and risk issues. The author also found that many of the headlines generally gave inclinations that climate change should be feared and it is catastrophic in nature.

A study by Zehr (2000) of global warming-related articles from large circulation newspapers in the United States (the New York Times, the Wall Street Journal, the Chicago Tribune and the Los Angeles Times) over the period of 1986–1995 found scientific uncertainty to be a prominent theme, made possible by representing climate change as a controversial issue. Similarly, Boykoff (2007) described an analysis of newspaper articles and television news stories and semi-structured interviews with climate scientists and environmental journalists. Analysis of these items indicated that the media have presented climate change to the public as an issue of controversy, despite growing consensus by scientists that climate change is indeed occurring.

McComas and Shanahan (1999) conducted a content analysis of climate change news stories from the New York Times and the Washington Post that appeared from 1980 to 1995. Their examination of climate change salience showed a cyclical pattern where climate change would gain popularity in some years, and then decline in others. They also found that when climate change salience increased, it was portrayed more as a dangerous issue and its consequences were emphasized more. Alternately, when global warming received less media attention, uncertainty amongst scientists was a more predominant theme.

Taylor and Nathan (2002) explored the role of science in climate change coverage in British

tabloid and broadsheet newspapers. The study observed that both types of newspapers use science as a major factor in representing climate change. The tabloids tended to use the science to sensationalize climate change. Such overstatements were found to occur less frequently in the traditional newspapers. The authors also note that most of the articles present the consequences of climate change with only a small focus on the cause of climate change, which, the authors' state is possibly done to avoid making the readers feel as though if they lead a consumptive lifestyle, they may be a cause of the problem.

Boykoff and Boykoff (2007) investigated how well the news media adhered to journalistic norms in their analysis of American newspaper and television coverage of climate change from 1988 to 2004. One of their main conclusions from their analysis was that the adherence to first-order journalistic norms (personalization, dramatization and balance) can influence second-order norms (authority order and balance). They assert that this influence can lead to an information deficit, which could lead to inaction by policy makers.

McManus's content analysis (2000) of seven Australian newspapers' coverage of the Fourth Conference of the Parties to the Climate Convention (COP4) in Buenos Aires that took place in November 1998 found that a disconnect, or ''disanciation'' (separation of cause and effect with respect to a given issue), was created by the media. The author found that in the articles, there were no links made to the daily lives of the Australian public, which caused the ''disanciation''. Coverage of climate change was also found to be minimal and was not enough to likely generate any public issue.

The UN Framework Convention on Climate Change (UNFCCC)

The United Nations Framework Convention on Climate Change (UNFCCC) sets an overall framework for intergovernmental efforts to address climate change. The ultimate objective of the convention is "to stabilize greenhouse gas concentrations at a level that will prevent dangerous human interference with the climate system". With 194 parties, the UNFCCC has a universal membership.

Under the convention, the membership governments commits to gather and share information on greenhouse gas emissions, launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

Since the UNFCCC entered into force, the parties have been meeting in Conferences of the Parties (COP) to assess progress in dealing with climate change. The COP is seen as the "supreme body" of the convention. Since this event plays a major role in shaping the opinions of the government officials and people it's important to analyze the media coverage on this conference.

The Doha effect

The Doha climate change conference will focus on extending the Kyoto Protocol, an emissions deal for industrialized countries, and to take steps to raise billions of dollars to help developing countries adapt to a shifting climate. The U.S. rejected Kyoto because it didn't impose any binding commitments on major developing countries such as India and China, which is now the world's No. 1 carbon emitter. The U.S. and other Western countries insist that the firewall in the climate talks between developing and developed countries must be removed so that the new treaty can apply to all nations. The aim of the research is to study the framing of the Doha climate change conference in three prominent English online news media, *The Hindu*, *The Times of India,* and *New Delhi Television (NDTV)* from November 1st 2012 to December 9th 2012.

Objective

The objectives of this study are:

- To identify the frames adopted by the three online news media like *The Hindu, The Times of India, and New Delhi Television (NDTV)* on articles related to Doha Climate Change Conference.
- To interpret the motives behind the framing in all the three news media.

Methodology

We selected three online news media like *The Hindu, The Times of India,* and *New Delhi Television (NDTV)*. We focused on articles related to Doha Climate Change Conference. Each of the three online news media was first screened entirely for articles mentioning "Doha," "United Nations" or "climate change conference" in their title or lead. For the systematic analysis of the news frames in the gathered articles we used the standard set of content analytic indicators to measure the prevalence of the five generic frames developed by Semetko and Valkenburg (2000).

Content analysis measure for frames (Semetko and Valkenburg, 2000)

Attribution of responsibility

- Does the story suggest that some level of government has the ability to alleviate the problem?
- Does the story suggest that some level of government is responsible for the issue/ problem?
- Does the story suggest solution(s) to the problem/ issue?
- Does the story suggest that an individual (or group of people in society) is responsible for the issue/ problem?
- Does the story suggest that the problem requires urgent action?

Human interest frame

- Does the story provide a human example or "human face" on the issue?
- Does the story employ adjectives or personal vignettes that generate feelings of outrage, empathy, caring, sympathy, or compassion?
- Does the story emphasize how individuals and groups are affected by the issue/ problem?
- Does the story go into the private or personal lives of the actors?
- Does the story contain visual information that might generate feelings of outrage, empathy, caring, sympathy, or compassion?

Conflict frame

- Does the story reflect disagreement between parties/ individuals/ groups/ countries
- Does one party/ individual/ group/ country reproach another?
- Does the story refer to two sides or to more than two sides of the problem or issue?
- Does the story refer to winners and losers?

Morality frame

- Does the story contain any moral message?
- Does the story make reference to morality, God, and other religious tenets?
- Does the story offer specific social prescriptions about how to behave?

(Economic) consequences frame

- Is there a mention of (financial) losses or gains now or in the future?
- Is there a mention of the costs/ degree of expense involved?
- Is there a reference to (economic) consequences of pursuing or not pursuing a course of action?

Discussion and results

Online Media	Articles	Percentage
The Hindu	9	37.5
The Times of India	7	29.1
NDTV	8	33.3
Total	**24**	**100**

Table 1: Percentage of the articles in three online media coverage

The total coverage on the Doha Climate Change Conference was comparatively very less than the earlier years. *The Hindu* has published 37.5% of articles and is slightly more than the other two.

The attribution of responsibility frame suggested that the climate change issue is a serious problem and requires an urgent action. Four important quotes are cited which deeply emphasize the need for action to combat climate change.

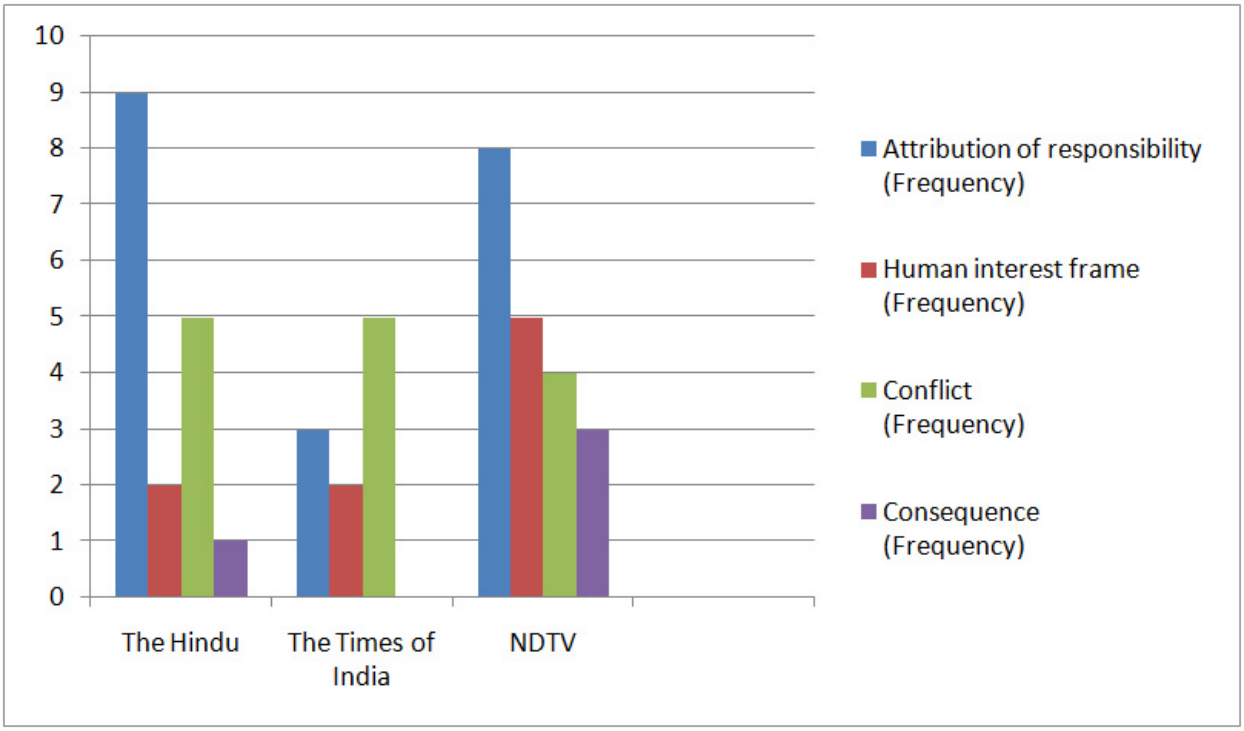

Figure 1: Frequency of parameters used in the news media

In an article in *The New Delhi Television (NDTV) titled* "Doha climate talks threatened over funding" dated December 07, 2012 quotes the France foreign minister Laurent Fabius, statement, "It appears we have already exceeded the 2-degree limit. If that is the case, there are absolutely catastrophic consequences. We must react. Tackling climate change was the new challenge in world diplomacy".

In *New Delhi Television (NDTV)* article titled "Poor countries demand action at UN climate talks". Britain's Minister of State for Energy and Climate Change Gregory Barkey stated that "Time is running out. I'm getting concerned that ministers are not stepping up to the mark and providing solutions that we need at this stage of the game," (The *NDTV,* December, 06, 2012).

United Nations' Secretary General Ban Ki-moon cited super storm Sandy, which struck the US east coast and the Caribbean, as a "call to action that before it is too late we have to take action." Also he suggested the negotiators at global climate talks in Doha to show "strong political commitment" to reducing Earth-damaging greenhouse gas emissions (The *New Delhi Television (NDTV),* December 04, 2012).

Greenpeace climate campaigner Martin Kaiser, who was also at the Doha talks, stated that "At the end of a year that has seen the impacts of climate change devastate homes and families around the world, the need for action is obvious and urgent." All these quotes from the conference emphasize the need for immediate action to combat climate change issues (The *New Delhi Television (NDTV),* November 24, 2012).

The human interest frame captures the issues that generate feelings of outrage, empathy, caring, sympathy. All the news media carried out one particular news item that captured this frame was the devastating Typhoon Bopha that occurred in the Philippines. The Philippines lead negotiator Yeb Sano made an emotional speech in the conference stating that "I am making an urgent appeal not as negotiator, not as a leader of my delegation but as a Filipino. I appeal to whole world, the leaders all over the world. Open your eyes to the stark reality we face. I appeal to ministers. The outcome of work is not what our political masters want. It's about what is demanded by 7 billion people. No more delays. No more excuses. Let Doha be remembered as the place where we found the political will to turn

things around" (The *New Delhi Television (NDTV),* December 06, 2012). The *NDTV* also published visual images of the devastating after typhoon pictures that generated sympathy.

The conflict frame usually captures the disagreements between parties. In case of climate change issue the conflict always exists between the developed and developing countries. Both rich and poor countries say emissions have to be reduced, but don't agree on how to divide the burden. Even the host nation Qatar was blamed that it disappointed by failing to make any pledges on reducing emissions or on delivering climate cash to help the poorest nations adapt. Even the developed countries like US, Australia and Canada, were heavily blamed by the various non-governmental organisations for blocking negotiations by their rigid and unrelenting stance on providing finance and technology to poorer nations.

Emmanuel Dlamini, the chair of the Africa Group of negotiators, stated that "poorer countries that are fighting for their survival were being labelled as deal breakers by the rich nations, insisting that all trajectories for historical responsibility cannot be overlooked" (The *New Delhi Television (NDTV)*, December 06, 2012).

Greenpeace's Kumi Naidoo criticized severely on the US negotiators by stating "US negotiators have been a stumbling block to negotiations consistently over the past few years. While coming in for climate talks, they forget to pack their consciences. Either their mandate needs to be refreshed or they should be called back" (The *New Delhi Television (NDTV)*, December 06, 2012).

Harjeet Singh from Action Aid questions that "They refuse to discuss the question of money; they have set up institutions but where are the funds? What is happening on the technology and IPR front?". These quotes clearly capture the conflicting nature of the United stated in not taking a clear stand in reducing their emissions (The *New Delhi Television Limited (NDTV)*, December 06, 2012).

The consequence frame captured the articles related to costs of expenses related to climate change issues. Text here captured the demands of the money required by the poor countries that are vulnerable to climate change. In an article from *New Delhi Television (NDTV)* titled "UN talks seen falling short despite climate change fears" dated 26 November, 2012 says that A study by the London-based International Institute for Environment and Development documents that rich nations had fallen short on promises to give poor countries $30 billion in new aid to help them combat climate change from 2010 to 2012, explains the costs required to poor nations for adapting to climate change. The mortality frame was not captured by any of the reviewed article.

Conclusion

The frequencies of articles published were only more or less slightly different from one another. The coverage was very weak compared to the coverage carried out in the previous years. The attribution of responsibility frame was given more importance by both *The Hindu* and *The NDTV.* The conference mainly urged the parties that climate change is a certain issue and everyone must react soon to combat it. Majority of the human interest frame was published from *The NDTV* that mainly talked about the Yep Sano speech on Typhoon Bhopa and the need for immediate solutions. No personal stories were found. And only one image was published by the *NDTV* that generated sympathy. The conflict frame was not much used by any of the news media, only a few articles captured the difference of opinion between the developed and developing countries. A very less number of articles were found under the consequence frame and mortality frame was not captured in any of the article. The newspapers dint report the local issues discussed in the conference. The conference ended without a clear framework on the extension of the Kyoto protocol and the financial issues involved in sanctioning to the poor countries. The principles of equity was avoided by The United States, adding to it there was no financial and emission cut commitments from the developed countries clearly affected the outcome of the conference.

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Risk communication and genetically modified crops in India: Studying key recommendations

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The debate on pros and cons of genetically engineered/ modified crops is universal. The voices of opposing Genetically Modified (GM) crops worldwide are also being echoed in India since the introduction of Bt cotton in the late 1990s. In India, in the face of vociferous protests, the Government of India appointed a committee to look into all aspects of GM crops including experiences of 10 years of Bt cotton cultivation in India.

The Parliamentary Standing Committee and GM debate

It took the committee two and a half years and a flawless process of intensive interactions with various stakeholders ranging from representatives of central and state government departments, farmers' unions and individual farmers, civil society organizations, scientists and seed industry. The result is a comprehensive and exhaustive report on Cultivation of Genetically Modified Food Crops in India: Prospects and Effects. The 31 member committee is headed by Shri Basudeb Acharia, Hon'ble Member of Parliament. The committee presented its report to the Lok Sabha on August 09, 2012 is historic in a way as it was adopted unanimously by all the 31 members, irrespective of their political affiliations.

Salient recommendations

Some of the important recommendations of the committee are as under:

Bt. brinjal case – Thorough probe recommended.

The Committee have been highly disconcerted to know about the confession of the Co-Chairman of Genetic Engineering Appraisal Committee that the tests asked for by Dr. P.M. Bhargava, the Supreme Court nominee on GEAC for assessing Bt. brinjal were not carried out and even the tests undertaken were performed badly and that he (chairman) had been under tremendous pressure as he was getting calls from industry, GEAC and the Minister to approve Bt. brinjal. Convinced that these developments are not merely slippages due to oversight or human error but indicative of collusion of a worst kind, they have recommended a thorough probe into the Bt. brinjal matter from the beginning up to the imposing of moratorium on its commercialization by the then Minister of Environment and Forests (I/C) on 9 February, 2010 by a team of independent scientists and environmentalists.
(Recommendation – Para No. 2.79)

Inexplicable changes in the organs and tissues of Bt. cotton seed fed lambs – Re-evaluation of all research findings by an expert committee - Impressed upon

Noting from ICAR 'Report on Animal Feeding on Bio-safety Studies with Biotechnologically Transformed Bt. Cotton Crop Seed Meal' conducted in 2008 that there was ***increase in liver weight, testicle weight, testicle fat and RBC in blood and decrease in WBC in blood in the lambs fed with Bt. cotton seeds***, the committee has recommended a professional evaluation of these developments, their possible causes and consequences by an expert committee comprising of eminent scientists from ICMR, pathologists, veterinarians and nutritionists.

Further, noting that the data in the Study Report pertaining to ***kidney weight, spleen weight, heart weight, lung weight, kidney fat, cole fat, pancreas and penis weight also shows variations in Bt. cotton seed fed lambs,*** the committee has also recommended a relook by the expert committee constituted for the purpose into all these findings and apprise them about their evaluation and interpretation of the data at the soonest. The committee has also sought the considered views of RCGM and GEAC on this Food Study Report and how it fared in their consideration while deciding the bio-safety and health safety aspects of Bt. cotton.
(Recommendation – Para No. 2.90 & 2.91)

GEAC and RCGM – In depth and comprehensive examination by the nodal Parliamentary Committee - Requested

The Committee has noticed several shortcomings in the functioning, composition, powers, mandate, etc., of GEAC and RCGM in their regulatory role for the assessment, evaluation and approval of transgenic crops in the Country. Noting that these two entities are under the jurisdiction of Department Related Standing Committee on Science and Technology, Environment and Forests, the Committee have requested their sister Committee to take up GEAC and RCGM for an in depth and comprehensive examination and Report to the Parliament.
(Recommendation – Para No. 2.92)

Setting-up of an all encompassing Bio-safety Authority – Stressed upon

Noting with concern the grossly inadequate and antiquated regulatory mechanism for assessment and approval of transgenics in food crops; the serious conflict of interest of various stakeholders involved in the regulatory mechanism; the total lack of post commercialization, monitoring and surveillance, the committee has felt that in such a situation what the country needs is not a bio-technology regulatory legislation but an all encompassing umbrella legislation on bio-safety which is focused on ensuring the bio-safety, biodiversity, human and livestock health, environmental protection and which specifically describes the extent to which bio-technology, including modern bio-technology, fits in the scheme of things, without compromising with the safety of any of the elements mentioned above. They have, therefore, recommended to the Government, with all the power at their command, to immediately evolve such a legislation after due consultation with all stakeholders and bring it before the Parliament without any further delay. The committee has also cautioned the Government that in their tearing hurry to open the economy to private prospectors, they should not make the same fate befall on the agriculture sector, as has happened to the communications, pharma, mineral wealth and several other sectors in which the Government's facilitative benevolence preceded setting up of sufficient checks and balances and regulatory mechanisms, thereby, leading to colossal, unfettered loot and plunder of national wealth in some form or the other, incalculable damage to environment, bio-diversity, flora and fauna and unimaginable suffering to the common man.
(Recommendation – Para No. 3.47 & 3.48)

Examination of Research Reports on Bt. brinjal – by an agency other than GEAC- Emphasized in view of conflict of interest

Having observed that in pursuance of the direction of the then Minister of Environment and Forests (I/C), GEAC is examining various reports on merits and demerits of genetically modified crops in consultation with eminent persons and scientists, the Committee have opined that it is a clear case of conflict of interest. GEAC approved the commercialization of Bt. brinjal on the basis of its own assessment as the apex regulatory body. Therefore, it should not sit on judgment of its own decision and also on the merits and demerits of various reports on genetically modified crops. They have, therefore, recommended expeditious evaluation of these reports by some public sector agency such as CSIR, who not only have sufficient experience in the matter but also have minimum conflict of interest.
(Recommendation – Para No. 5.56)

Failure of DAC at policy making level in regard to transgenics in agriculture sector - Criticised

The committee has criticized the Department of Agriculture and Cooperation for having failed

to discharge its mandated responsibilities, in so far as, the introduction of transgenic agricultural crops in India is concerned, as a policy matter. They ignored the farmers' profile in India i.e. 70% of them being small and marginal ones, levels of mechanization, non-availability of irrigation facilities, the cost-benefit analysis, the uncertainty of yield, loss to biodiversity, etc. They have, therefore, recommended an in-depth probe to track the decision making involved in commercial release of Bt. cotton including how Bt. cotton became a priority when the avowed goal of introduction of transgenics in agricultural crops was to ensure and maintain food security.
(Recommendation – Para No. 6.144 & 6.146)

Lacs of tonnes of Bt. cotton seed oil having gone into food chain unnoticed, in the last decade or so – Explanation from Department of Consumer Affairs sought

Having found out that during the last decade or so of Bt. cotton cultivation in the country lacs of tonnes of cotton seed oil extracted from Bt. cotton has gotten into the food chain, with various agencies including the Department of Consumer Affairs, FSSAI, etc., being oblivious of this fact, the committee have sought an explanation of the Department of Consumer Affairs from the point of view of consumer protection, consumer rights, informed consumer choice, etc., immediately.
(Recommendation – Para No. 6.148)

Effect of transgenic crops on medicinal crops and plants and non-inclusiont of Department of AYUSH on GEAC – Explanation sought

In view of the serious reservations expressed by the Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy about the likely impact of transgenics in agricultural crops on the medicinal value of various plants, the committee has sought a detailed explanation from GEAC about action they had taken on the advice of Department of AYUSH while approving commercial release of Bt. brinjal. The committee has also sought a detailed explanation from Ministry of Environment and Forests on their refusal to co-opt the representative of Department of AYUSH on GEAC right away, when Bt. brinjal was approved for commercial release and several other crops having medicinal propriety are already being assessed/ approved by RCGM/ GEAC.
(Recommendation – Para No. 6.149)

Negative impact of transgenic crops on Exports – Consideration requested

Being told by the Department of Commerce that there may be no real demand for export of GM crops when the emphasis is on organic production, the committee has asked the Government that the negative impact of Genetically Modified Crops on country's agricultural export needs to be factored in while taking a decision in regard to introduction of such crops.
(Recommendation – Para No. 6.151)

Suitably equipping NBA and FSSAI for effective discharge of their mandated roles – Exhorted

Observing severe deficiencies in the human resource and infrastructure at the disposal of National Biodiversity Authority and Food and Safety Standard Authority of India, both of whom will be playing a crucial role in ensuring biodiversity and food safety respectively, the committee has strongly recommended to the Government to adequately strengthen both these agencies with scientific, technical and other human resource of best quality, along with sufficient infrastructure without any further delay.
(Recommendation – Para Nos. 6.152 to 6.156)

Labeling of GM products – Recommended.

Upholding that the consumer has the supreme right to make an informed choice, the committee has recommended that the Government should immediately issue regulation for making labeling of all Genetically Modified Products including food, feed and food products so as to ensure that the consumer is able to make an informed choice in the important matter of what she/ he wants to consume.
(Recommendation – Para No. 7.63)

R&D on transgenics in agricultural crops

should only be done in strict containment and field trials under any garb should be discontinued forthwith – Strongly recommended.

The committee after critically analyzing the evidence placed before them, both for and against the transgenic agricultural crops have, in view of the compelling concerns regarding India being one of the richest centres of biodiversity; agriculture providing sustenance to almost 70% of rural populace; more than 70% of India's farmers being small and marginal farmers for whom agriculture is not a commercial venture but a way of life and a means of survival; food security and safety; manpower intensive nature of agriculture in India; the severe agrarian crisis afflicting the country for years now; 60 percent of cultivated area still being rain fed; the irretrievability of transgenic crops once released in the environment; effects on environment, human health and livestock and animal health; the gross inadequacy of the regulatory mechanism, the total absence of post release surveillance and monitoring, the absence of chronic toxicology studies and long term environment impact assessment of transgenic agricultural crops; the virtual non-existent nature of the oversight bodies like National Biodiversity Authority, Protection of Plant Varieties and Farmers' Right Authority, Food Safety and Standards Authority of India, etc., recommended that till all the concerns voiced in their Report are fully addressed and decisive action is taken by the Government with utmost promptitude, to put in place all regulatory, monitoring, oversight, surveillance and other structures, further research and development on transgenics in agricultural crops should only be done in strict containment and field trials under any garb should be discontinued forthwith.

These two key official reports clearly suggest the mindset and psyche of Indian society for acceptance of new scientific knowledge on one hand and a rational and analytical approach on the other.

(Recommendation – Para Nos. 8.116, 8.121 & 8.125)

The Technical Experts Committee and GM field trials

The Technical Experts Committee (TEC) appointed by hon'ble Supreme Court of India to assess the impact of GM crops on Indian agriculture and the propriety of conducting field trials has submitted its interim report in October 2012. The TEC had unanimously asked for a number of conditions to be met before any GM field trials are undertaken in the country and has recommended a ten year moratorium on field trials of Bt food crops, moratorium on field trials of Herbicide Tolerant Crops (till independent assessment of impact and suitability) and ban on field trials of GM crops for which India is the centre of origin/ diversity.

Conclusion

These two key official reports clearly suggest the mindset and psyche of Indian society for acceptance of new scientific knowledge on one hand and a rational and analytical approach on the other. Hopefully, adequate scientific study and practical appraisal to be carried out carefully in due course would provide evidence based decision making for us to chose the right path towards the GM foods.

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Role of mass media in crisis communication

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Introduction

Communication is one of the lifelines of humankind poised to many challenges. Communicating meaningful science in society seems much more challenging, especially during crises. A good amount of progress has been achieved in this direction. However, without effective and convenient dissemination these developments are not going to yield positive results. Nowadays, mass communication has presumably acquired position amongst four basic needs of human beings after food, shelter and clothes. The present paper explores how to figure out target groups for dissemination of science especially in difficult terrains like northeast region of India. Media has the capacity to carry messages of science and there seems an urgent need for creating interface between personnel and institutions involved in science communication including scientific community and research laboratories. It is quite natural that we cannot expect this community to be media savvy. The paper therefore explores the scope of media intervention in disseminating science in effective and productive manner as well.

"Communication is not only a system of information, but also an integral part of education and development" - McBride Commission Report (1978). Without the slightest of any doubt mass media is the most effective and influential tool for making information available to people at a cheaper and convenient method. It is a highly 'impersonal' tool that lacks personal touch. It is a welcome and interesting aspect of attracting attention of people and influencing them to certain extent. Mass media enjoys the unique distinction of reaching with ease even the remotest areas. As a carrier of messages it has no 'parallels'. Only thing is to prepare messages in the most effective way so that they can actually influence the target audience in the desired manner. It is also one of the most powerful forces for shaping public opinion. This fourth pillar of a democracy has innumerous achievements to its credit in creating popular public opinion as well as correcting the same. Evolving civilizations across the globe have complicacies in various walks of life, which are addressed through public awareness movements using big amount of media campaigns, where science also is not spared.

Role of mass media

The findings of a study by a communication expert in USA show that exploitation of mass media tools by terrorist outfits throughout the world has been a strategy for reaching out to masses, as a means of 'psychological warfare' for getting their messages across. A counter 'psychological fight' can also be waged to create awareness leading to wider public opinion and activism to combat risks and crises. This activism can be either at group or community level or at an individual level. If mass media can rise up to the extent of transforming even half the target population and if every member of the population lives up to the expectations and does his or her bit effectively then almost half the battle against ignorance is won. This will shape develop an activity, which eventually may deliberate goal-oriented strategies aimed at achieving science literacy.

Like any other meaningful profession, media also has to shoulder some responsibility towards society. Mass media is an open university and an able platform where virtually any issue under the sun can find a place for debate, discussion and deliberation so that both positive and negative aspects of them can arrive at a meeting point. Media's most important role is not only to disseminate information

to the people but also to make or convert them into thinking 'human beings'. But mere possession of information will not yield anything much worthwhile and one has to process this information and apply them to relevant aspects.

Mass media also has to perform the 'Agenda-Setting function. This means putting up certain issues of importance in front of the public in such a manner that they become the concerns of the masses. And they in turn are moved to think and deliberate on them seriously and finally act on them. It motivates people to decide over issues and aspects - out of many – which are competing for attention. Armed with moral commitment, media has to take up the responsibility of promoting awareness of human rights violation in the light of scientific temper, especially in insurgency prone areas.

The purpose of communication is to bring in a change amongst people so that they become conscious of their responsibilities and act logically to contribute to the greater interest of the society at large.

The messages, programmes or software, which are to be aired, published or prepared for creating science awareness must actually make the recipient of messages a thinking person. Mere receiving the messages may not be sufficient; it must kindle the thought process, with an ability to make people think rationally. Then only the process of 'empowerment' will be completed in actual terms and will produce desired changes in the recipients' lifestyle. The purpose of communication is to bring in a change amongst people so that they become conscious of their responsibilities and act logically to contribute to the greater interest of the society at large.

Mass media options

First of all the media must dedicate more space and time for science awareness issues. Having a pool of talented professional communicators is highly important to have the desired effect upon the target audience. Nowadays, mass media are becoming more and more interactive with newer styles of presentation and communicating with stakeholders. It can be converted into an interesting 'multimedia' campaign, as we have the scope for utilizing TV, radio, films and documentaries, traditional culture in the form of community songs and drama, modern tools like internet and mobile telephony, etc.

In case of print media, more than 65,000 journals and newspapers of varied kinds are in circulation in the country today with a combined circulation 18 crore copies (2007). This figure is growing annually at an impressive rate of 18%. There has been a steady and remarkable growth of vernacular newspapers across the nation. This phenomenon is led by Hindi newspapers with almost 50% of total circulation followed by those in prominent Indian languages. It implies that more number of people living in remotest parts is able to read newspapers in their own language or dialect. On the other hand, radio listenership is around 60 million a day, that too in 24 languages and 146 dialects cutting across the length and breadth of the nation. By another estimate by AIR Audience Research Unit, this figure is put at a mind boggling 32 crore a day. Further, there are 37 private and 139 AIR FM channels, which boast of a listenership base of 96 million taken together.

Interestingly, AIR broadcasting network covers almost 100% geographical area of the country. If utilized properly, this is an ultimate development for any mass media. Even though all mass media are effective, yet the new concept of Community Radio is one of the most suitable ones in this crusade. This is because the print media or the newspapers, magazines or journals are not of much effect for majority of population, as many of them can't read or write. TV has its own natural advantage of being an audio-visual medium with a good influence on people. But this is a costly medium even today with no access in many far-flung areas. In the scenario, radio seems to be most ideal medium, especially community radio. Community radio is a small-caliber FM radio station with a limited range of about 10 to 30 km. radius. It is managed by the community in which it is situated with funding sourced from donations and grants so that they don't depend on public or private sector. Radio is a combination of school,

worship place, public rostrum, newspaper, theatre, and concert hall - all media devoted to education, entertainment, and enlightenment.

Some challenges

We all know that there is a considerable difference between what is ideal and what actually happens in practice. Today's media has been transformed into highly profitable business where we hardly find any developmental issue being focused. In the run up to derive maximum mileage out of the prevailing business opportunities, media basically ignores real issues and go for those which can attract profit. There seems a bias in coverage of important issues especially in metropolitan media, though the situation in local or regional media is not much different. On the other hand, on the part of the government also there has been steady decline of interest towards maintaining institutions promoting public good. This is evident from the fact that the governments have been insisting for quite some time now that these organizations should make efforts for generating their own resources rather than depending fully on government finances for everything. It is true that funding should not be available for ever but at the same time there is a risk of carrying the bias of whosoever pays for running these programmes. For example, in a private TV or radio channel or a newspaper public-interest advertisements and issues may not be adequate and satisfactory. Exercising restraints while dealing with stories of secessionists' organizations' activities would be difficult. Further, the way the killings of members of these outfits are presented - more so in vernacular newspapers - they become heroes in the minds of the public. It also called 'Stockholm Syndrome', where secessionists manage to develop such a relationship with their captive victims that the latter begin to sympathizing with the former. As a contrast, do you recall any violent photograph or video in the aftermath of the 9/11? It was a wise decision not to show the destruction in a gory manner as it would have indirectly fueled the terror psyche of the group responsible for the incident. Rather people wanted to know more about scientific facts such as architecture of the buildings, the material used, its tensile strength, and nature of construction, etc., in detail. So, mass media has a greater role to play in finding and reporting science that can really help people overcome crises with right kind of knowledge and right kind of attitude.

Conclusion

The study revealed despite possessing such an enormous potential, mass media is hardly being utilized for promoting awareness as well as activism about important social causes in our society including science and technology during crises. This is a pitiable condition as instances of disparities due to lack of appropriate knowledge and spirit are ever increasing. Thus, it could be a worthwhile exercise if mass media takes up all possible public causes actively and create awareness among all concerned so that remedial measures can be adopted while dealing with practical and widely acceptable solutions.

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Technology, philosophy and communication

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This age is attributed to the age of technology, where technique is the defining characteristic and is the central component to define this era. Technology is the result of the desire of mankind to overcome its adversaries in nature, the physical reality, and master over his primitiveness, when the philosophers created natural elements, such as water, air, fire and earth as the fundamental principles of all existence. This inherent urge for winning over nature gave birth to modern technology, which has now become a tool for overall development symbolizes power of a nation. This dominating force has its share of philosophical problems too. Different historical periods have evoked different philosophical responses. Our era increasingly is an appraisal of technology, the foundation of all contemporary action. The appraisal of technology is an attempt to place it in the appropriate philosophical category.

The classification, understanding and definition of technology are paramount to its communication. However, the capitalist mode of production by division has sprung up specialties making it inconvenient for their interaction with non-specialists. It calls for a meaningful dialogue between philosophy and technology. The result is isolation of disciplines and lack of communication of their contents not only amongst general public but also amongst specialists too. The lack of technology communication has affected the general public to the extent that it is placed in the category of magic, which too is the outcome of the mystical yearning we had for manipulating nature to our wishes and whims.

The escalating, overwhelming and unimaginable technological progress and lack in its communication has mystified it and generally placed it in the realm of magic. The commonality of technology and magic is the expression of our mystical and metaphysical yearning to manipulate, engineer, and dominate the nature or natural. This intrinsic characteristic of technology to engineer or design has led it to become a dominating force it has attained. Lewis rightly claims it to be the tool of domination between nations or men[1]. This article intends to summarise some of the approaches to understanding technology and its communication, obviously there are no conclusions, only a few hints.

All societies have faced the common problems of food, shelter and transport; the reason for the assumption of scarcity in classical political theories. Despite the technological advancements, great disparities still stare us straight on the face; we are surrounded with unfathomed 'haves' but at the same time are indifferent towards 'have-nots'. The advances in technology have provided man with the possibility to lead a fearless life with the assured comfort of being least affected by nature or natural calamities. We have drawn up tools from nature and are building wonders into nature.[2] Technology has reduced the world to a global village. Technology today permeates all folds of life.

We recently witnessed the mechanisation exhibiting itself in its stark ruthlessness in the unimaginable mechanised warfare. We can explore the world with technology or destroy it thus communication has to play an emphatic role to ensure an informed decision that comes through a scientific and technological attitude. The daunting task may be made easier by increasing technology literacy and communication consequently involving public at large and democratisation of technology with ethics and humanism rather its politicisation.

Technology is least bothered about normative or ethical questions with regard to its advancements, its achievements, its progress, etc. Technology is primarily and only concerned with practical solutions to practical problems and refining of practices for optimal output. It therefore appears that abstraction the hall-mark of philosophy stands in contradistinction to technology and there seems hardly a meeting ground. Philosophy primarily deals with

peripheral concepts of particular disciplines, which rarely has the time to consider them, including the appropriateness of method. For example, science happily unperturbed carries on assuming a cause and effect relationship; philosophy explores alternatives. Science may accidentally or in a philosophical mood stumble onto some methodological considerations; philosophy deliberately moves in that direction. Technology questions what the best material to construct a particular bridge is; the efficacy of the method to produce polythene bags; the cheapest way to get pure drinking water, etc. Philosophy of technology will be an effort to establish the relationship between science, applied science and technology; the notion of technological efficiency; the ethics of cloning; etc.

The texts of technology hardly show a consistent use of key terms like technology, technique and technics, still technology has a confident gait. However, given this commonly accepted taxonomy, the depth of integration between technology, technique and technic still requires attention implying that philosophy of technology is in its infancy. The current debate in the academia is on the meaning and nature of 'technology'. Technology as a term refers to a collection of artifacts, a form of human action, and a form of knowledge or a social process. Naturally a distinction is drawn between technological (artificial) and natural objects, which involves the relation between man, nature and culture. However, a distinction is also drawn between science and technology as types of knowledge. The autonomy of technology that is its own inevitable course of development unaffected by the social, political, economic and cultural milieu is also under debate.

To start with technology needs to be distinguished from science and applied science. In science we investigate, in technology we create, thus successful technology may at times be in conflict with the prevalent science. Feibleman supports the view that science, applied science and technology can be distinguished by the difference in their aims[3]. Scientific theories aim at acquiring of knowledge, applied science aims at exploring the possibility of their practical application and technology is the actual practice of operation, the operative, the skill, the modus operandi. For example science studies the general principles of gravitation and other related general empirical laws; applied science deals with the spacecraft trajectory and rocket size; technology will construct the spacecraft and cope with any practical problems that may arise in the process of the take off and successful functioning of the spacecraft.

The problems of nature and meaning of technology on the surface appear to be very different from the economic, social or political problems arising out of technological activities. The underlying philosophical considerations activate the cognitive aspects forcing technology to be viewed as an epistemological issue. However, technology can also be viewed as a problem of relation between man and nature, the social relations. Science being different in its pursuits to technology entails a philosophy of technology separate from philosophy of science. The former at present is primarily concerned with establishing the epistemological status of technology, whereas the goal of scientific activity is the knowledge of objective reality or formulation of laws of nature. It can easily be argued that technology is not pursuit of knowledge but of efficacy or effectiveness in producing artifacts or technological objects. Technology it is sometimes argued is the scientifically laying down of the principles of technical practices of producing artifacts. However, this alluding to science refers only to systematic arrangement of contents, which is an attitude or approach. This should not be confused with the task of science in terms of grappling with theories or general empirical principles to explain the objective reality. In technology there are very few generalities the concerns vary with branches of engineering, for example, in civil engineering it is durability of construction, in mechanical it is consumption of energy or in electronics the speed of the process.

Technology is a set of heterogeneous requirements, it may even be polymorphous, where a definite categorization might not even be possible and where Wittgenstein's family resemblance may fail to categorise. There will be different yardsticks of technological progress depending not only on the field of technology but also the context of the requirement. For example, in war-time essential element in the construction of a bridge to move armoured vehicles is not durability but speed of construction. Bunge has argued that modern technology develops when rules of pre-scientific crafts, where conventional rules are adopted by trial and error,

are replaced by 'grounded rules' of technological theories[4]. Technological theories are rational rules or systematically laying down or foundational rules for optimal practical action, concerned with operations of man, especially operations of man in direct relation with it. The direct relationship with technology readily throws up philosophical, ethical and political questions that transcend strictly conceptual questions and therefore easier to communicate.

There are differing understandings of technology, to repeat technology is sometimes understood as originating in man's attempt to subordinate nature defining him as a tool using animal. Mumford, on the contrary, argues that man is originally life centered and not work centered as is made out by defining him as tool using animal[5]. He argues that original man was concerned with actualising a multiplicity of functions, life development and enhancement that comes under bio-technics as contrasted with mono-technic, the current status of technology, which is the systematic organization of exploitation of physical energies for the purpose power pursuit. Mumford suggests that abandoning the mono-technic approach alone could press technology in the full service of human culture.

The most fundamental political task of a technological world is that of systematising and institutionalising the social expectations of the changes that technology will continue to bring about.

Jacques Ellul favours a sociological approach towards understanding technology. The sociological approach would attempt to define technique as the totality of methods rationally arrived at and having absolute efficiency for a given stage of development in all fields of human activity[6]. The emphasis is removed from considerations of intrinsic characteristic of technology and placed on its relation to society. According to Ellul technique is evolved through solving practical problems but this is at the expense of creating others. Plastic bags solved the problem of carrying material back from the market but created an ecological crisis. The solution to protecting food grain created the problem of pesticide poisoning. The internet and high speed connectivity across the globe created the need for censoring.

The relation of technology to society pertinently raises the philosophical question with regard to the neutrality of technology. It is difficult to claim neutrality in the manufacturing of the atom bomb. The argument that 'technic is neutral the use may not be' is open to debate. For example, it is very easy to avoid walking down to the corner shop with a car parked outside the house staring straight in one's face, use me it says and it is difficult to resist. In other words, technics influence use by their presence and as such serve as a social force which cannot then be claimed to be neutral. The matter can be placed more succinctly by pointing out that at present technology gets its thrust from war requirements, where war is considered as the legitimate means to establishing peace.

Technology has opened up increasing possibilities for action and freedom of choice, which create new ethical and political responsibilities. Technology has broken up the old or conventional value system. The eternity of values has given way to relativity of culture and value. The philosophical question is whether this does not bring with it the responsibility of maybe bringing about new political order corresponding to the new technology. Mesthene has argued that, "…the most fundamental political task of a technological world…is that of systematising and institutionalising the social expectations of the changes that technology will continue to bring about"[7]. The most fundamental political task before us as a technological world is to systematise and institutionalise the social expectations of the technological advancement, progress and benefits it will continue to bring. It is an intellectual exercise to understand the effects of technology but to profit from the opportunities is a political endeavour. Politics is the set of means by which man uses forces inherent in society and technology is the set of means by which man puts the forces and laws of nature to use. Politics is purely human domain while technology lies between man and nature.

To recognise a difference between technology and science is important since it will establish the difference in communication. Science as argued is

grappling with theories or general empirical principles to explain the objective reality, which is difficult to identify with and thus its communication is problematic. However, technology affects directly and is not as far removed therefore its communication is not going to face the same problems. Technological artifacts are attractive unlike dry formulae, public have a natural inclination to learn of these artifacts. It may be suggested that any argument that technology does not easily understand or is not easily accessible to the public at large is vacuous and dependent on the false premise of identifying it with science. The relationship between man and technology is far more direct. The directness forces upon us the sociological approach, especially since the claim to neutrality of technics does not stand scrutiny.

Wartofsky's presidential address to the Society for Philosophy and Technology meeting in Bordeux in 1989 where he warned, "Talk about revolution is easy, but revolution is hard"[8]. He claimed that unlike earlier technological revolutions occurring with the replacing of substance, like wood with steel and steel with synthetics, the next revolution is more difficult and will require politicizing of technology. The idea of politicizing technology invites a number of interpretations. The hand mill led to feudalism and the steam mill gave industrial capitalism, the technological changes determine forms of political life. Wartofsky's politicizing technology means democratising technology that is sharing of power and educating the public to a technical understanding to the extent that some forms of democratic participation in scientific-technical policy-making becomes feasible and useful.

The notion of democratisation of technology basically implies an effort to improve technology literacy and communication. This is even more so important if we are to have a participatory democracy where everyone is to have his or her share in the decision making and no one can assume ignorance and inability to communicate.

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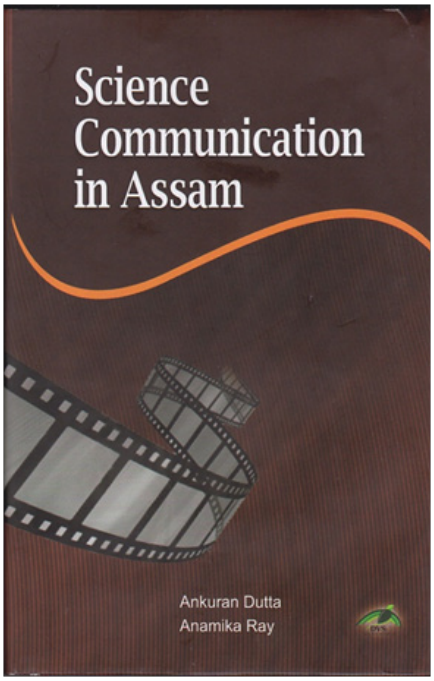
A legacy of scientific renascence in Assam



Science Communication in Assam
by Dr. Ankuran Dutta and Dr. Anamika Ray

The book 'Science Communication in Assam' written by Dr. Ankuran Dutta, Associate Professor of mass communication, Krishna Kanta Handiqui State Open University, Guwahati and Dr. Anamika Ray, Assistant Professor of mass communication, Gauhati University, India, is an important document in the field of mass media. The 300 page book is basically an eye-opener for the common man who finds it difficult to gauge the meaning of science communication. The book has been meticulously compiled by the authors after careful analysis and research in the field of science communication. Keeping in mind the growing importance of science communication in Assam, the authors have delved deep into the growing importance of science communication in Assam. This book will indeed address the problem of communication of scientific methods and temperament to the common masses. It discusses at length the concept of science communication, media coverage of science in Assam, role of folk media for science communication in Assam, cartoon as an emerging tool for disseminating science based issues, organizational initiatives for science communication in Assam - both in public and private sector and science communication through distance mode.

Prof. David Skinner, Chairperson of the Dept. of Communication Studies, York University, Canada has commented on the book as "in this ground breaking work, Dr. Dutta and Dr. Ray provide a clear and detailed account of the complex relationships between science, journalism and society in their home province of Assam.....this book is both a handbook and a history, and indispensable guide to science communication in Assam, of interest to journalists, scientists, educators, public policy makers and the general public alike".

According to Dr. Manoj Kumar Patairiya, Director/ Scientist 'F' in NCSTC, Ministry of Science and Technology, Govt. of India "this book is a step forward towards encouraging the thought process and creating standard teaching learning materials to cater to the science communication enthusiasts in general and budding science communicators in the north-eastern region in particular."

The book has altogether fifteen chapters, each chapter dedicated to an important aspect of science communication. Chapter five, which deals with the 'media coverage of science in Assam', is an interesting component. It talks about the coverage of science based news and views by different forms of media with special emphasis on print, audio, audio-visual, community media and alternative media. The 'prospects of folk media for science communication in Assam' has been discussed at length in chapter seven. The role of various types of folk communication forms like oral tradition, materials culture, and social folk customs for development purposes have been integrated in this chapter. In short, the propagation of science through folk media has been emphasized upon.

Another interesting and intriguing part of the book is the discussion on the 'use of cartoon for

communicating science' in chapter eight. Use of cartoons in science communication is a groundbreaking one considering the fact that illustration in any form conveys varied meanings promotes understanding of the concept. People tend to communicate with illustrations more than with writings or verbal messages. Cartoon is a very engaging, fun oriented and attractive medium for all sections and for all age groups. The groundbreaking depiction of 'the yellow kid' as a lead character in Hogan's alley started the trend of using comic strips for entertainment and educational purposes. The science through cartoon can be recognized as scientoon. Scientoons are a novel class of cartoons that not only entertain a person but also disseminate scientific information while drawing one's attention towards a particular problem.

Chapters ten and eleven have been devoted to the organizational initiatives for science communication in public and private sector in Assam. While lauding the untiring efforts of national council for science and technology communication (NCSTC) in popularizing science, the authors have especially described the different science communication related organizations in Assam. Special mention may be made of the activities of Assam Science Technology and Environment Council (ASTEC), Regional Science Centre and Science Museum, North East Institute of Science and Technology (NEIST), Assam Agricultural University, Institute of Advanced Study in Science and Technology (IASST) And Indian Institute of Technology (IIT), Guwahati in disseminating scientific news and inculcating a scientific temperament among the masses. As far as the private sector is concerned, the authors have clearly mentioned the broad spectrum of activities and awareness campaigns undertaken by some of the major organizations and NGOs like Assam Science Society, Bharat Jana Vigyan Jatha, Aranyak, Nature's Beckon, Gramya Jana Bigyan Mancha and Assam Science Writers' Association.

The contributions made by some of the renowned science communicators and educationists towards science communication have been well appreciated in chapter twelve. Some of the illustrious persons and their contributions to the development of scientific knowledge in the society like Dr. Bijoy Krishna Dev Sarma, Dr. Dinesh Ch. Goswami and Shri Khiradhar Baruah have been lucidly written. Another important aspect which the book has touched upon is the propagation if science communication through distance mode in Assam in chapter fourteen. The growth and importance of distance education in the present context is of paramount importance. As such there is an urgent need to propagate science communication through certain communication tools like radio, television, video, computer, etc.

Communicating science through media and science popularization are very much intermingled with each other. The science communication done by science journalists and writers facilitates to pave the way to prepare a scientifically literate society. Research papers, books and other study materials pertaining to the Assam region is very limited. Precisely the book is aimed at drawing the attention of all the professionals, students and other media personnel who want to have a good grasp over the content and matter of science communication especially in Assam.

[T.D. Baruah, Guwahati, Assam]

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To our Readers

Indian Journal of Science Communication invites readers' views and critical comments on any of the aspects of the journal. Suggestions for further improvement in presentation of the journal and its contents are also welcome. Selected letters would be considered for publication under the column '*Letters to the Editor*'.

The 63rd Lindau Nobel Laureates' Meeting - 2013

Confluence of knowledge, wisdom and excellence in science

Official Opening: Countess Bettina Bernadotte with 18 Nobel Laureates - Front row from left: Rudolph A. Marcus, Gerhard Ertl, Walter Gilbert, Akira Suzuki, Dan Shechtman, Countess Bettina Bernadotte, Robert F. Curl, Aaron Ciechanover, Walter Kohn, David J. Wineland Back row from left: Richard R. Ernst, Erwin Neher, Robert H. Grubbs, Kurt Wüthrich, Werner Arber, Theodor W. Hänsch, Hartmut Michel, Peter Agre, Brian Kobilka

– 63rd Lindau Nobel Laureate Meeting: 30 June–5 July 2013 – Focus on chemistry
– A week of dialogue: 35 laureates met 600 young scientists from over 80 nations
– Federal Minister Johanna Wanka: "Making excellent science tangible"
– Nobel Peace Laureate Ramos-Horta and bishop Stålsett participate in the dialogue
– Chemistry Nobel Laureate Brian Kobilka on the future of drug development
– Catalysts as keys to sustainable development

Bettina Bernadotte, Countess of Bavaria and President of Council of the Lindau Nobel Laureate Meetings

Strong signals and high expectations at a lecture

Meeting of Nobel minds

The 63rd Lindau Nobel Laureate Meeting was officially opened on Sunday, 30 June, 2013 in Inselhalle, Lindau by Bavarian Countess Bettina Bernadotte, President of the Council of the Lindau Nobel Laureate Meetings. Her opening speech ushered a week of intercultural dialogue among elite scientists of different generations: 35 laureates and more than 600 young scientists from almost 80 countries took part in the meeting, the only one of its kind in the world. Until Friday, 5 July, 2013 the focus was on chemistry. In addition to issues surrounding basic research, discussions were centered on chemistry's application in areas such as power supply, pharmaceutical research and sustainable resources. Although the concept of ''green chemistry'' was one of the main topics on the meeting's agenda for the week, biochemical processes and structures, and the generation, conversion and storage of chemical energy were also the subject of the many speeches and discussions held.

''Science and education were catalysts of international understanding,'' said Countess Bernadotte. ''The language of science is universal and is understood across all national, cultural or religious boundaries''. This is a fact that is also underscored by the attendance of Nobel Peace Laureate and former president of East Timor, José Ramos-Horta. In addition to cutting-edge scientific topics, issues that affect society as a whole and matters of global consequence are assuming an ever greater significance on the agenda of these meetings. After all, debates on the influence and responsibility of the scientific community extend beyond the circle of meeting participants and into society at large.

In her words of welcome, German Federal Minister of Education and Research Johanna Wanka said, ''excellent science transcends borders; today successful scientific careers take an international course. There are a few places in the world where cutting-edge research is made as tangible for young scientists as here in Lindau.'' Along with Minister Wanka more than 200 guests of honour from politics, business and sciences were present at the opening ceremony.

More than 600 especially qualified science students, doctoral and post doctoral students participated in the meeting. ''I am impressed by the expertise, the curiosity and the energy of the young participants. The Lindau Meeting offers them a unique opportunity for the intercultural and intergenerational exchange of knowledge and ideas exchange and for networking,'' declared Hartmut Michel, the German Chemistry Nobel Laureate, who has attended the Lindau Nobel Laureate Meeting this year for 16th time. Physics Nobel Laureate Steven Chu, who was the US Secretary of Energy until April 2013, was also in Lindau again this year. Attending for the first time were the 2012 Nobel Laureates Brian Kobilka (Chemistry), Serge Haroche and David Wineland (both Physics), whose lectures were highly illuminating.

A view from Lindau Lighthouse on a sunny day

Science Breakfast with Serge Haroche and David Wineland

The great beginning

Since 1951, the annual Lindau Nobel Laureate Meetings have offered scientists an internationally acclaimed forum for exchanges and networking. The intergenerational dialogue between Nobel Laureates and young scientists provides significant impetus and new ideas for universal collaboration in science and research.

The Foundation Lindau Nobelprizewinners Meetings at Lake Constance, which has 262 Nobel Laureates in its Founders Assembly, used the opening ceremony as an occasion to pay tribute to the social commitment and the dedication to education, science and research of three supporters and companions of the Lindau Meetings: Gunnar Stålsett, bishop emeritus of Oslo and member of the Norwegian Nobel Committee, the organization responsible for awarding the Nobel Peace Prize, Markus Storch, who chaired the Nobel Foundation for 17 years, and Klaus Tschira, co-founder of a software company and benefactor of one of Europe's largest charitable foundations, were admitted into the Honorary Senate. Wolfgang Schürer, Chairman of the Lindau Foundation's Board of Directors, described the three as outstanding personalities who had been role models, working selflessly in the service of society.

"Educate. Inspire. Connect." is the leitmotif of the Lindau Meetings, and it is the reason for the Nobel Laureates' exceptional dedication. They invest a week of their precious time pro bono to build bridges between the generations and provide young scientists with experience, inspiration and motivation. With their speeches, as candid participants in the numerous discussions and as advisers and mentors in master classes they hold, the laureates make a valuable contribution to achieving that aim. Anyone with an interest in science anywhere in the world can follow what goes on at the Lindau Meetings over the internet, sharing in the fascination of what the laureates have to relate. A clear indication for more effective and better-tolerated drugs is what many are hoping for. Since the mid-1980s, expectations surrounding the decoding of the genetic blueprint of G protein-coupled receptors (GPCRs) have been high, given that half of all medicinal drugs deploy their effect through these molecular antennae. GPCRs are specially embedded in the surface of cells in our body, passing through the cell membrane seven times and activating proteins, known as G proteins, on the inside of the cell membrane. It is these that transmit the signals from most hormones and neurotransmitters. Without GPCRs we cannot see, taste or smell.

American physicians Brian Kobilka and Robert Lefkowitz were honoured with the 2012 Nobel Prize in Chemistry for the discovery and structural elucidation of GPCRs. However, the number of innovative drugs that work on the basis of GPCRs and have been approved for use to date is fewer than had been expected. Brian Kobilka's speech, which opened the scientific programme of the 63rd Lindau Nobel Laureate Meeting in the first week of July, illustrated the challenges and difficulties facing drug discovery

Guess me!

A butterfly wants to talk to Nobel Laureate Prof. Serge Haroche!

today. The significance of the relatively new knowledge about spatial structure and three-dimensional functionality of GPCRs for the future of drug development holds great interest not only for the 600 young scientists and researchers at this meeting, but also offers tremendous opportunity for biochemical-engineering based industry.

As a medical student, Brian Kobilka worked in a hospital's intensive care unit, where one of the things he learned was how the hormone adrenaline can save a person's life by increasing their heart rate. Just a few years before, Robert Lefkowitz was the first to demonstrate the presence of adrenaline receptors, whose existence had been disputed up to then. The topic caught Kobilka's imagination and he resolved to study these receptors in more detail. As a post-doc in Lefkowitz's lab, Kobilka helped decode the genetic blueprint of the beta-2 adrenaline receptor. But only tiny amounts of the receptor could be isolated, making it impossible to reconstruct any more than individual fragments of the complete blueprint. Nevertheless, he did manage to use these fragments as probes in a genetic library and decode the complete structure of the beta-2 adrenaline receptor gene by employing an immensely creative and incredibly tedious method.

The results of his analyses, published in 1986, were intriguing: the adrenaline receptor actually re-

Children attending Harold Kroto's buckyball workshop

Children overwhelmed at Harold Kroto's bucky-ball workshop

Martin Chalfie during a discussion session with young researchers

Nobel Laureate Roy Glauber attending a lecture

sembled rhodopsin, the retina's light receptor which is folded seven times. The two receptors were evidently related despite having completely different functions - both being members of the GPCR family, which as we now know incorporates almost 800 distinct receptors in humans.

From then on, Brian Kobilka was obsessed with GPCRs. Filled with ''irrational optimism'', as he puts it, he set his mind to elucidating the form and functionality of the adrenaline receptor with the help of X-ray crystallography. He had few competitors in the early days; most scientists considered it a futile endeavour. It took 18 years for Kobilka to grow tiny crystals of the receptor, finally accomplishing that in 2004. Still, the crystals yielded no useful structural data. Another three years passed before Kobilka was able to decode the adrenaline receptor's atomic structure in 2007. In 2011 he successfully visualized the structure of a receptor in action - a masterful performance.

The knowledge of this spatial structure and functionality finally gave pharmaceutical research scientists direct access to the atomic structure of GPCRs. Most medicinal drugs that work through GPCRs were already known before the receptor family itself had been discovered. Once their genetic code had been revealed, the intensive search for new drugs could begin with the help of high-throughput

A young researchers' session in progress

Participants at a plenary session

Rowdy Blokland (with cap), a science journalist from The Netherlands and others at Media Centre

Martin Chalfie, José Ramos-Horta and Countess Bettina Bernadotte on last day at Isle of Mainau

screening - something which has been on-going for the last two decades. In further stages of the development chain, many of the discovered substances have neither proved to be effective enough nor to be sufficiently well-tolerated. A perfectly accurate, differentiated structure of active ingredients could change all that - something which the elucidation of GPCR structures has brought within reach. At the 63rd Lindau Nobel Laureate Meeting, Brian Kobilka has discussed with young scientists how this could be extremely promising for future drug discovery and development.

Giving green chemistry a hand

Sustainability is not just another buzzword for the research chemists of today. Indeed many make an effort to conduct their work with the desire in mind to make a contribution towards sustainable development. ‘‘It’s so incredibly important that we chemists in particular take more responsibility for the environment,’’ stresses Melanie Mastronardi, a Canadian doctoral student from the University of Toronto. ‘‘That’s why I try to raise awareness for green chemistry technologies and methods, and endeavour to live up to this ideal in my own research.’’

Countess Bettina Bernadotte opening the Exhibition “Sketches of Science” at Isle of Mainau

Steven Chu, Countess Bettina Bernadotte, Minister of Science, Research and the Arts,Theresia Bauer, and young researcher Emalick Njie at the Farewell Ceremony at Isle of Mainau

Concluding seminar at Beden

A panel discussion on peace at Beden

Mastronardi is one of more than 600 young scientists from almost 80 countries who have taken part in the 63rd Lindau Nobel Laureate Meeting. They had the unique opportunity to exchange knowledge and ideas with 35 Nobel Laureates. The concept of ''Green Chemistry'' is one of the focal points on the meeting's agenda. Biochemical processes and structures, as well as the generation, conversion and storage of chemical energy, had also been the subject of numerous speeches and discussions.

In the early 1990s, American chemists Paul Anastas and John C. Warner began formulating a concept of ''Green Chemistry''. The twelve principles of their concept are geared toward making chemical production as resource-sparing, energy-efficient and environmentally-compatible as possible. The aim is to avoid harmful raw materials and end products, to reduce waste and to minimize accident risks. The use of catalysts is of immense importance here. They effectively hasten chemical reactions that would otherwise take much too long: reactions are accelerated and less energy is needed. That's why chemistry is all but inconceivable without catalysts in the modern era.

An oil industry discovery in the 1950s is what opened the door to environmentally friendly

Panel discussion "Why communicate" with Ada Yonath, Brian Kobilka, and Sir Harold Kroto

Ada Yonath at a panel discussion "Why communicate"

Sir Harol Kroto at a panel discussion "Why communicate"

A glimpse of Bavarian cultural evening at concluding ceremony

chemistry. During the process of steam cracking, researchers found it was possible, under certain conditions, to convert an unsaturated hydrocarbon, an alkene also known as an olefin, with a methyl group (propylene) into two other alkenes, one with two methyl groups and one with none. But it wasn't until 1970 that French chemist Yves Chauvin was able to explain this phenomenon using the effect of a metallic catalyst. The latter caused the molecules to bind with each other temporarily so that they could exchange methyl groups. Chauvin received the 2005 Nobel Prize in Chemistry for his detailed description of olefin metathesis along with Americans Robert Grubbs and Richard Schrock. In 1990 and 1992, they presented a number of particularly effective catalysts for metathesis and were instrumental in furthering the development of more efficient and environmentally friendly methods of synthesis for applications, such as pharmaceuticals and plastics.

In his speech on ''Green Chemistry and Catalysis'' at the 63rd Lindau Nobel Laureate Meeting, Robert Grubbs highlighted the significance of catalysts for the transition to a bio-based economy. One of the keys, for him, lies in developing carbon sources from renewable resources, with the help of metathesis, for use in industrial processing.

This chemical method enables certain plant components to be split into saturated and unsaturated hydrocarbons. The former finds application as fuels of various kinds and the latter can be used as

A musical evening presented by South Korea

Prof. Dr. Dr. H.C. Wolfgang Lubitz, Scientific Chair of the 63rd Nobel Laureate Meeting, in conversation with Dr. Manoj Kumar Patairiya

Boat trip to the Isle of Mainau: Grand finale onboard

An exhibition at Town Hall, Hamburg

staples for the organic synthesis of materials such as plastics. However, the process is only sustainable if the raw materials it employs are not harvested in a way that competes with food production; in other words they must come from the non-edible parts of plants. Bio refineries, for example, should one day be capable of recycling wood chips or straw for both energy and material on an industrial scale.

A panel discussion to close this year's Lindau Nobel Laureate Meeting has seen experts debating the prospects for the concept of green chemistry. Participants included Chemistry Nobel Laureate Mario Molina from Mexico and Physics Nobel Laureate Steven Chu from the USA. Molina was awarded the 1995 Nobel Prize in Chemistry together with Dutchman Paul Crutzen and American Frank Sherwood Rowland, for research on the ozone layer. Chu served as Energy Secretary in US President Barack Obama's first administration. The two men were joined by German chemist Michael Braungart, who co-developed the ''cradle-to-cradle'' concept of the environment friendly resource cycle. The discussion took place on Mainau Island in Lake Constance, the very place where the ''Green Charter of Mainau'' was signed in 1961. This was one of the very first sustainability initiatives and came about at the instigation of Count Lennart Bernadotte, co-founder of the Lindau Meetings. The concept of sustainability has taken on increasing significance at the Lindau Meetings themselves, as debates on the influence

Indian young researchers meet Dr. T. Ramasami, Secretary, DST, besides Dr. Torsten Fisher, Director, DFG India and Mr. Phillips from German Embassy in India

Indian group with DFG President Prof. Dr. Peter Strohschneider (3rd from left, 1st row) and Dr. Arabinda Mitra, Advisor & Head, International Cooperation, DST (4th from the left, 1st row) and Mr. K.V. Sarma, Science Counselor, Indian Embassy, Berlin (5th from left, 1st row) in Lindau

Mr. Ajit Gupte, Deputy Chief of Mission in Berlin with young researchers from India

Dr. Torsten Fisher, Director, DFG, India Office; Dr. K.V. Sarma, Science Counselor in Indian Embassy; Dr. Monika Sharma, Programme Officer, DFG Hyderabad Branch; and Ms. Ruchi Chopra, at Indian Embassy made of red stone from Rajasthan in Berlin

and the responsibility of the scientific community extend beyond the circle of meeting participants and into society at large. Helga Nowotny, President of the European Research Council (ERC) has said that the prestigious Lindau Nobel laureate meeting is about fostering the best budding talent. Prominent research institutions like ERC have a significant presence in the meeting facilitating young researchers to opt challenging research careers.

Why communicate?

A special panel discussion on "Why communicate?" was able to attract a houseful of young as well as senior scientists assembled from all over the world. A diverse group of panelists featured a mix of Nobel Laureates and professional science communicators - 4 Noble Laureates - Brian Kobilka, Sir Harold Kroto, and Ada Yonath; besides Betrice Lugger, Joint Scientific Director, National Institute of Science Communication, Germany; and Simon Engelke, a student participant and entrepreneur. The panel discussion was moderated by Adam Smith, Edito-

Prof. Oliver Reiser narrates his research in organic chemistry at University of Regensburg

Indian researcher presenting his research at University of Regensburg

A crowded notice board communicating science engagements at Regensburg

Dr. Torsten Fisher with Prof. Dr. Rudiger Tiemann and colleagues, Humboldt University, Berlin

rial Director of Nobel Media. Adam Smith opened the discussion and said: These days, with so much emphasis placed on the need for public engagement with science, the question "why communicate?" might appear almost redundant. Isn't it obvious that scientists need to tell the world what they are doing and that the more energy they put into doing so the better? Ada Yonath while addressing the issue of why scientists are required to communicate said that scientists have a responsibility to engage the people with what they are doing in the laboratory (and even, in some cases a combination of the two!).

The discussion focused to take stock of the current science communication scene and reflect on what all this effort is for. It came to the fore that with more opportunities and channels for communication available than ever before, scientists are probable in closer contact with the public that at any other period! Scientists are under increasing pressure to communicate from funding agencies, their own universes and companies and indeed from the media. But all this communication takes time, potentially posing the practicing scientists with the dilemma whether to focus on their research or to take time out to talk abbot it? Brian Kobilka was of the opinion that scientists generally are not good communicators. Sir Kroto wanted that there is a need of a set of people who can translate the scientific concepts to the lay publics. There emerged a variety of questions. On one side lies the attraction of the ivory tower, on the other the attraction of the public arena. How should one decide on an appropriate balance? And what, in fact do we want to achieve? Is the goal to demonstrate why scientific research is beneficial to society or to demonstrate why scientific understanding is important in itself? If both, are these goals necessarily interrelated, or should we be trying to separate our approaches to them?

These questions themselves raise the more fundamental issues of why we undertake scientific research at all, and whether scientists expect the public to engage with not only the outcomes of science but the practice of science too. What, fundamentally, do we want to convey when we communicate science? The panelists together spanned the range from those who take obvious joy in communication of science to those who, as a rule, prefer not to step into the limelight! It followed an interesting question and answer session. The discussion came to a deadlock on the issue of over complexity and over simplicity of science communication. Dr. Manoj Kumar Patairiya, IJSC, has presented a solution to the problem by suggesting different kinds of science communication, i) for scholars and researchers; and ii) for common man and children, which was appreciated by the panel and was acceptable to the audience. Simon Engelke suggested new media as a means of communication for scientists, such as, blogs, facebook, and webpage, etc.

A Bavarian evening was showcased gala cultural performances of the state by Elite Network of Bavaria. Dr. Wolfgang Heubisch, Minister of Sciences, Research and the Arts of Bavaria welcomed the gathering and Robort Huber delivered his il-

University of Bonn

Solar panels along the river bridge in Bonn

luminating lecture "Bavaria – Land of Science & Research". Young researchers Nadja Bertleff and Thomas Hopf presented a glimpse of current research projects in the Elite Network of Bavaria. Bavarian music and folk dances added colours to the concluding wherein the participantes also enjoyed dancing with Bavarian folk artistes.

Prof. Dr. Dr. H.C. Wolfgang Lubitz, Scientific Chair of the 63rd Nobel Laureate Meeting while talking to Dr. Manoj Kumar Patairiya onboard the lake cruise shared his views about the meeting. He thanked the entire Nobel Laureates community for joining and interacting freely with young scientists. The location of Lindau being at the lake constance offers unique geographical and climatic value to the organizers and participants from different parts of the world. He feels that scientific discourses are very fruitful and would go a long way towards shaping the imaginations of newer research themes by budding scientists.

Challenges to peace and justice in the 21st century

A panel discussion on challenges to peace and justice in 21st century as well as green chemistry held on the island of Mainau led by Fred Guterl (*Scientific American*). The panelists were Nobel Laureates Jose Ramos-Horta and Gunnar Stalsett (former Bishop of Oslo and member of the Nobel Peace Prize Committee) and Mario Molina. The stimulating discussion took place on the irrelevance of nuclear race by some third world countries in the modern world.

The meeting concluded with a boat trip to the island of Mainau, sponsored by the State of Baden-Württemberg, to promote the state as a "Centre of Science and Good Living". The Baden-Württemberg minister of science research and the arts welcomed the 650 international guests onboard the lake cruise. A variety of formats and features were applied to make the meeting more lively, fruitful, and engaging to one and all, such as Science Breakfast, Master Class, Young Researchers' Session, Meeting the Laureate, Lecture & Discussion, Presentation, Social Function, Academic Dinner, Press Briefing, Panel Discussions, Plenary Lecture, Parallel Session, Reception and Concert, etc. In addition, a well equipped Media Centre coordinated by Christian Schumacher and Nora Ahramn was in place besides Lindau Nobel Social Media Community, involving The Lindau Mediatheque, and Nobel Labs 360^0.

An art exhibition "Digital Constellations" was also put together by Nobel Laureate Wally Gilbert at City Museum, Lindau. Another exhibition "Starry Nights" was also an attraction at City Museum, Lindau, put together by Joan Miro. The Lindau experience is not only about connecting science and scientists, but it is also about connecting cultures, arts and civilizations to science!

Indian young researchers explore German research

The group of young Indian researchers selected by

The group at Berlin in front of the bus taking the caravan in Germany

Beer park in Munich

the Department of Science & Technology (DST), New Delhi had a pre-departure briefing at DST, New Delhi. Dr. T. Ramasami, Secretary, DST told the students, "In life we come across several situations and some can be life-changing experiences - one such is the Lindau experience. The exposure you will all get is an investment for the future. In such get-togethers you learn from three sources: Engaging with and learning from your peer group from around the world; conversing and drawing inspiration from Nobel Laureates who ought to be seen not just as prize winners but as real people who have gone through difficult processes and enjoyed the pursuits; and benefit from the ambience charged with the enthusiasm and unique scientific presentations that is bound to inspire everyone. However, inspiration cannot be forced; it is an individual process that comes from within when you are ready to receive and be inspired. When that happens, you will have that life changing experience - so go on that journey - not just to Lindau but beyond".

Dr. Torsten Fisher, Director, DFG India and Mr. Phillips, German Embassy in New Delhi also shared their views on the occasion. Mr. Phillips said that Lindau Nobel experience is another good way of strengthening the Indo-German relationship".

Professor Dr. Peter Strohschneider, President, German Research Foundation (DFG), Dr. A. Mitra, Head, Internatl Cooperation, Department of Science and Technology (DST), Govt. of India, and Dr. K.V. Sharma, Science Counsellor, Indian Embassy in Germany received the Indian group comprising 22 young researchers in Lindau for a week of intellectually stimulating lectures, discussions and interactions with Nobel Laureates. The DFG President said that Lindau meetings offer a fertile ground for new ideas and the group will take advantage of it. Dr. Mitra told that like previous years, the DST and DFG have jointly supported the participation of the Indian group at the meeting and a subsequent tour of German research institutions. Dr. Mitra suggests that a liberal approach to support our young researchers in such international exposures would be immensely beneficial to the country.

After concluding the 63rd Lindau Meeting of Nobel Laureates from 30th June to 5th July, 2013, the Indian group headed for another week towards a study visit to German scientific research institutions on July 6th. The excited young researchers found the meeting as a great opportunity to meet not only the Nobel Laureates but also aspiring young scientists from different parts of the world. They called it as a platform for mingling with likeminded people from contemporary scientific fields that offer cross pollination of ideas giving birth to new ones.

The post-Lindau visit had a wider perspective for future studies and possibilities of participating in collaborative research in Germany and in India. The visit while showcasing the scientific landscape of Germany also encountered with rich cultural heritage of Germany.

The scientific visit began from University of Regensburg where Indian and German researchers presented their research projects in the Institute

The Deutsche Museum in Munich

A view of Hamburg Harbor

of Organic Chemistry. Prof. Oliver Reiser and Dr. Petra Hilgers delivered lectures and invited Indian researchers to associate themselves leading edge research in the university. Prof. Oliver told in his lecture that he receives a good number of requests from Indian students for coming to the University for joining research and many of them find their way to join us. The group also had a chance to have interaction with Indian students there. INDIGO – Indian German Graduate School of Advanced Organic Synthesis for Sustainable Future is an initiative to foster research in the field of mutual interest.

After arriving in Berlin, the group headed to Fritz-Haber Institute der Max Planck Society. Dr. Gert von Helden and his colleagues demonstrated different experiments and explained emerging science concepts. It also offered a meeting place for Indian and Chinese young researchers coordinated by DFG.

The evening in Berlin had a special delight with Indian aroma and flavor. The dinner was hosted by Indian Embassy in Germany, Berlin. Mr. Ajit Gupte, Deputy Chief of Mission received the group accompanied by Dr. Torsten Fischer, Director, DFG, India Office. In his welcome address, Mr. Gupte emphasized on the growth of Germany has made over the period since it was devastated after the World War II. He said that the Indian students must learn from the way Germans are progressing. He especially mentioned their methodical approach, value system, engineering skills, hard work, and organized way of working to achieve excellence in every walk of life.

The next day was devoted to Humboldt University zu Berlin. Dr. Katharina Schultens, Managing Director, School of Analytical Sciences, and Prof. Janina Kneipp addressed the group and shared the cutting edge researches that the university is pursuing. The visit to the Fritz Haber Institute (FHI) was highly enriching, where Indian and Chinese scholars have got a hands-on exposure to latest research experiments and technologies. A combined information session for young scientists from India and China was organized at DFG headquarters in Bonn, followed by a visit to Wilhelms University, Bonn. It was refreshing to meet some Indian Lindau alumni in Bonn who are already engaged in active research in German institutions.

Next day the group visited the Institute of Inorganic Chemistry in the University of Heidelberg. Prof. Chang Qing, Director General, Bureau of International Cooperation, National Natural Science Foundation of China told that the Chinese group of researchers is regularly participating in the Lindau meetings.

The major scientific themes covered in the visit were: solid state chemistry and heterogeneous catalysis, empirical analysis to the teaching-learning process, organic synthesis of functional systems, applied analysis and environmental chemistry, nano-scale optical spectroscopy, and free electron laser facility, etc. Besides scientific tour, the group also visited famous Neuschwanstein Castle on the way from Lindau to Munich and had chance to go for site seen in different cities in Germany.

Torsten Fischer, Director, DFG India Office told that the German House, a consortium of re-

search intuitions in Germany, is a one point contact located in Delhi from where students can access information for different universities and institutions of Germany. A de-briefing was also organized on return of the group in DST and many of the young participants plan to go abroad for collaborative post doctoral research and come back to serve the nation.

Mr. R.K. Sharma, Senior Scientist, International Cooperation, Department of Science & Technology, Govt. of India coordinated the group from Indian side and said that the Lindau expedition is a continuing process of building bonds and creating new vistas to the world of scientific research. Lindau model presents a natural and Nobel way of inspiring young minds to excel in any and every walk of life and offers a great confluence of knowledge, wisdom and excellence in science.

Asklepios Klinik St. George established in 1190 A.D, Hamburg

Indian Young Researchers at Nobel Laureates' Meeting 2013, Lindau, Germany

1.	**Venuka Durani Goyal** Post Doctoral Fellow, Structural Biology Lab, Chemistry Department, IIT Bombay, Mumbai
2.	**Syed Khalid Yousuf** INSPIRE Faculty, Indian Institute of Integrative Medicine (IIIM), Jammu
3.	**Pradeep P.S.** Student, Department of Chemistry, University of Kerala, Thiruvananthapuram
4.	**Anjali Devi Das** M.Sc. Student, Group 1(Organic), Department of Chemistry, Delhi University, Delhi
5.	**Shwetha Srinivasan** Student, BS-MS, Indian Institute of Science Education and Research, Mohali
6.	**Athira George** Integrated BS-MS Student, Indian Institute of Science Education and Research, Thiruvananthapuram
7.	**Jimmy Joy** Student, Indian Institute of Science Education and Research, Thiruvananthapuram
8.	**Pratik Kumar** Student, Indian Institute of Science Education and Research, Kolkata
9.	**Arobendo Mondal** Student, Indian Institute of Science Education and Research, Kolkata
10.	**Garima Jindal** Ph.D. Student, Chemistry Department, IIT Bombay, Mumbai
11.	**Lagnamayee Mohapatra** SRF, Colloids & Materials Chemistry, Institute of Minerals & Materials Technology, Bhubaneswar
12.	**Abhijnan Ray Choudhury** JRF, Dept. of Organic Chemistry, Indian Institute of Science, Bangalore
13.	**Reshmi Thomas** PhD Scholar, Indian Institute of Science Education and Research, Thiruvananthapuram
14.	**Naisa Chandrasekhar** CSIR-SRF, School of Chemistry, University of Hyderabad, Hyderabad
15.	**Sukdeb Saha** Senior Research Fellow, Central Salt and Marine Chemicals Research Institute, Bhavnagar
16.	**Trapti Aggarwal** Senior Research Fellow, Department of Chemistry, University of Delhi, Delhi
17.	**Debasish Manna** Student, Dept of Inorganic and Physical Chemistry, Indian Institute of Science, Bangalore
18.	**Arun Ankush Tanpure** SRF, Indian Institute of Science Education and Research, Pune
19.	**Shaji Varghese** Research Scholar, Department of Chemistry, Scott Christian College, Nagercoil
20.	**Subhendu Roy** Inte. Ph.D. Student, Dept. of Inorganic & Physical Chemistry, Indian Institute of Science, Bangalore
21.	**Shibdas Banerjee** Research Scholar, Department of Chemical Sciences, Tata Institute of Fundamental Research, Mumbai
22.	**Srinivasarao Kancharla** Senior Research Fellow, Salt & Marine Chemicals Division, CSMCRI, Bhavnagar

[Dr. Manoj Kumar Patairiya, Indian Journal of Science Communication, Technology Bhavan, New Delhi-110016, and Mr. Christian Schumacher, Communications, Council of Lindau Nobel Laureate Meetings, Lindau, Germany; Photos: Manoj Kumar Patairiya, Christian Flemming, Rolf Schultes, Christian, Garima and Indian Group]

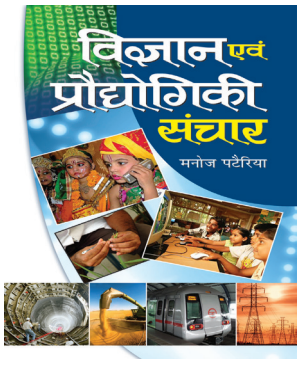
■

Rajeev Gandhi National Gyan Vigyan Award

Dr. Manoj Kumar Patairiya receives the honour from His Excellency President of India Shri Pranab Mukherjee in the presence of Hon'ble Minister of Home Affairs Shri Sushilkumar Shinde and then Hon'ble Minister of State, Home Affairs Shri Jitendra Singh.

His Excellency President of India Shri Pranab Mukherjee has conferred the 3rd Rajiv Gandhi National Gyan Vigyan Award 2010-11 upon Dr. Manoj Kumar Patairiya, a well known scientist in science communication, in a function held in Vigyan Bhavan, New Delhi on September 14, 2012 for his book on Science and Technology Communication (Vigyan Evam Praudyogiki Sanchar).

The award carries a Cash Prize of Rs. 75,000-, a Citation and Memento. The award is given away by the Department of Official Language, Ministry of Home Affairs, Govt. of India to encourage original creative writing in the field of Science & Technology. The book comprises different segments on science and technology communication and offers authentic narratives on the subject. The contents are mostly creative and suggestive in nature and are useful for not only the beginners but for the professionals as well. Hon'ble Minister of Home Affairs Shri Sushilkumar Shinde and then Hon'ble Minister of State, Home Affairs Shri Jitendra Singh were also present on the occasion.



Vigyan Evam Praudyogiki Sanchar (S&T Communication)
By Dr. Manoj Kumar Patairiya
Prabhat Publications, 2011

[Prof. M.A. Ansari, Department of Communication, G.B. Pant University of Agriculture & Technology, Pantnagar, Uttarakhand]

■

An important initiative

Dear Editor,

I am a scholar in the field of science communication in Mexico and I want to congratulate you, because of the Journal. I think the *Indian Journal of Science Communication* is a very important initiative to promote and disseminate technical knowledge in this field, particularly in countries like India and Mexico ("emerging countries"). I am looking for the new editions of the journal.

Thank You.

[Carlos Enrique Orozco, Professor Numerario en Comunicación Pública de la Ciencia, ITESO, Universidad Jesuita de Guadalajara, Mexico] ■

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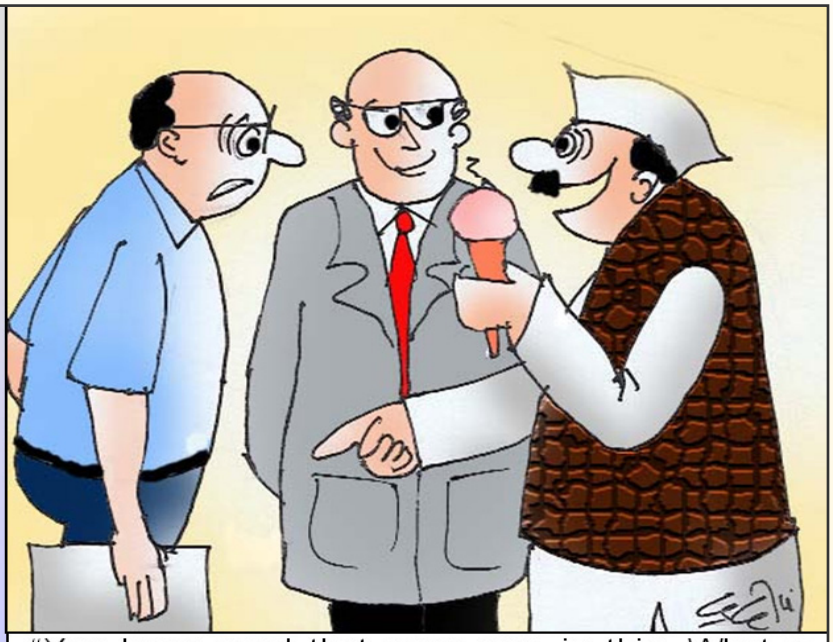
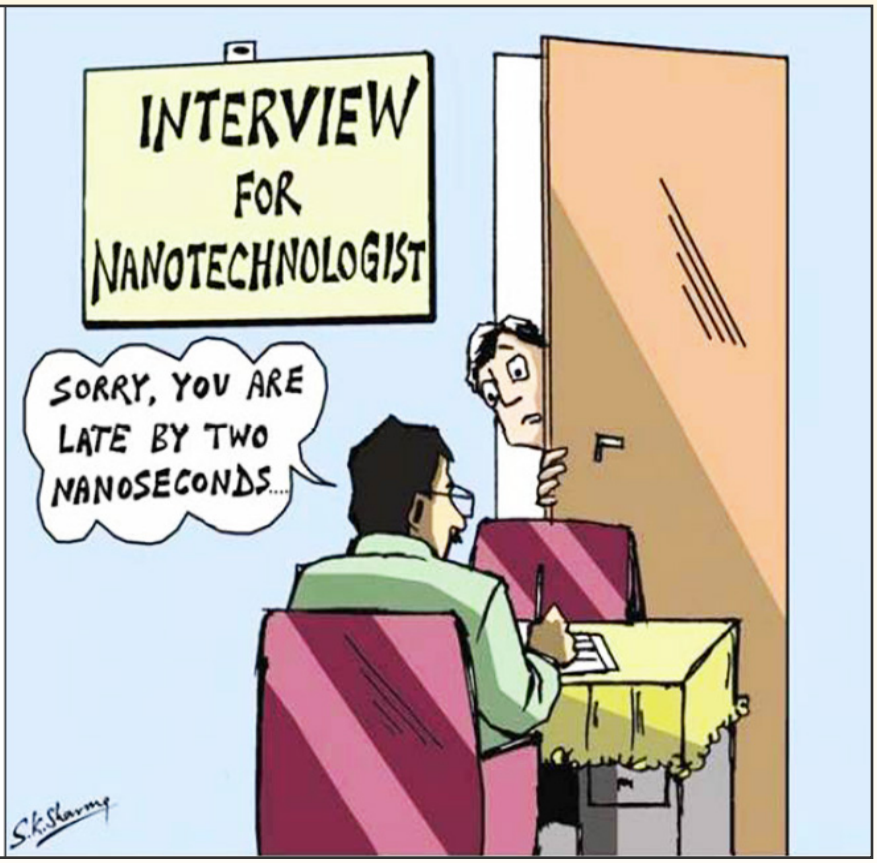
SCIENTOON

A group of US Scientists has isolated the gene found in Guar gum (*Cyamopsis tetragonoloba*) which is used in making ice cream as it is responsible for giving creaminess required for the ice cream. **Guar gum retards ice crystal growth non-specifically by slowing mass transfer across solid/liquid interface.** They have successfully transferred this **ICE CREAM GENES** into the popular US crop ***soyabean.***



"You have used that guar gum in this. What a tasty ice cream! Look! Cancel all my program to conferences on Coal, Cement, Heavy industries etc., and accept all invitations for Carbohydrate conferences."

Nanotechnology is a field of research and innovation concerned with building things and devices on the scale of atoms and molecules. **Nano in Greek means "dwarf". A nanometer is one-billionth of a meter i.e.(10^{-9}m): ten times the diameter of hydrogen atom.** The diameter of human hair is, on an average 80,000 nanometer.



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