

Sustainable science

What Planet Earth means for Indian Science Congress

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THE 94th edition of the Indian Science Congress, held January 2-7, 2007 at Annamalai University in Chidambaram, Tamil Nadu, sought to be different. Revolving around the theme of "Planet Earth", it sought to "address vital issues related to our natural habitat". The areas of deliberation included energy security, earth-ocean-atmosphere interactions, climate change and the science of forecasting monsoons. Focus also fell on crucial problems such as natural and human-made hazards and waste management. So, was it a conference devoted to tackling issues that went beyond the merely scientific, that had a decidedly political—even global-political—edge? The venue was in one of the worst tsunami-affected districts of Tamil Nadu; could it be that scientific practice in India, well-known for its political reticence, was itself ready for change?

But what was uppermost in the mind of Harsh Gupta, the general president of the congress, and a former secretary of the department of ocean development, government of India: deregulating the coal industry, to enable greater extraction. Energy security, it emerged from his inaugural speech, meant applying geophysics to a wider and more effective hunt for atomic minerals, metals and fossil fuels.

Also note the scope and tenor of discussions related to issues such as climate change, a politico-environmental problem of global proportions, or forecasting the monsoon in India, an event that triggers annual politico-scientific crisis. In a 5-day programme comprising 29 'theme sessions' (five or six papers each) and 13 'sectional sessions', climate change was the subject of merely 7 papers. Scientists were aware that climate change wasn't fiction. A paper by V N Sharda of the Central Soil and Water Conservation and Training Institute projected, for instance, a 3.4 per cent increase in annual rainfall over

the Nilgiris in Tamil Nadu, but a 2-16 per cent decrease in rainfall in the Garhwal Himalaya and Gujarat in 2071-2100 as compared to 1961-1990. Most papers were generalist; only one, by Malay Chatterjee of Jadavpur University, Kolkata, focussed on global warming's impact on humans.

Monsoon forecasting received more attention. B N Goswami of the Indian Institute of Tropical Meteorology showed that the frequency and magni-

In the theme session on energy security, the attention was more on nuclear energy. However, there was nothing on safety issues. "Nuclear energy has been there for 50 years, it still generates only 3 per cent of the energy generated in the country. On the other hand the focus on renewable energy is relatively new. But it generates 6 per cent of the country's total energy," said S K Chopra, principal advisor and special secretary of the ministry of new and renewable energy.



Flowers and dignitaries, speeches and funds, but where is basic science?

tude of extreme rain events in Central India had increased, while moderate rain events had decreased: clearly, signs of a weather system out of kilter. In his analysis of operational forecasts during the past eight decades, M Rajeevan of the National Climate Centre (affiliated to the Indian Meteorological Department) showed that despite many changes in operational models and a better understanding of monsoon variability, forecasting skills had not improved: hardly a cutting-edge conclusion. A consensus seemed to prevail: the Atlantic monsoon system was more uncertain than all other such systems; thus, monsoon forecasting would remain an eternal problem.

A real disaster

Indeed, as scientist after scientist took to reading papers in various sessions, the most vital issue that began to emerge was a mandatory, but purely token, reference to environmental matters. If the discussions on disaster management were any indication, Indian science's sustainable turn seemed to head into a cul-de-sac. "The focus is till now on natural disasters," said U C Dey, retired additional director-general of the Indian Meteorological Department. "Monsoons, tsunami, earthquakes are now receiving more focus. But we are still not concerned about human-made disasters, like those of mining, or those of waste generation." In the allocation

of funds by the department of science and technology (DST), ministry of science and technology for research and development, there is none for disasters, anthropogenic or otherwise (see box: Money talks). Tsunami prediction was much debated, but scientists were silent on sustainable methods to pre-empt such a disaster.

Why weren't human-made disasters addressed? Explained Rishi Narain Singh, emeritus scientist of the National Geophysical Research Institute, "Because governments respond to public pressure, and natural disasters like tsunami and earthquakes receive a lot of public attention. On the other hand, human-made disasters do not receive public attention, unless they occur." He advised: "The media has a role in bringing the risks that are hidden from the public eye and potential sources of ecological damage that may lead to catastrophic changes," stressing that scientists tended not to link their research-solving skills to public matters. He also said that scientists should address more site-specific problems and not general problems. "For example, if somebody is working in Delhi he should focus on the air pollutants that cause problems in Delhi and not on general air pollutants in general," he elaborated. "There should be a new research mindset with the public involved in designing research strategies," Singh specified.

Any way out?

What would it take for Indian science to focus on questions of sustainability, or equity?

"To make environmental sciences a priority area, environment has to be made a priority stakeholder in development. It's not one today, because environment is still not regarded as an integrated area of study. We are still thinking very sectorially. Concern for planet earth should be integrated in our education system," believed U S Dey, an environmental sciences teacher at the University of Pune."

Despite the focus on planet earth, earth sciences gets just 7.3 per cent of funds. Most of it goes on improving extraction methods

Money talks

Current priorities belie avowed focus on Planet Earth

The 94th Indian Science Congress's focal theme stressed protection of the Earth from environmental degradation, natural and human-made disasters and the perils of pollution. But is the Indian science establishment geared to tackle such issues. Is it even interested? A look at how the Union ministry of science and technology disburses money compels an answer in the negative:

- R&D expenditure has remained at around 0.8 per cent of GNP since the 1990s. At present it is 0.84 per cent: far below the target of 2 per cent of GNP

- While earth sciences were thought to be integral to accomplishing the "Planet Earth" objectives, it hardly enjoys proper R&D support. It receives just 7.32 per cent. Most of this is spent on better methods of extraction. Engineering and technology enjoys the highest amount of support of 38.15 per cent. Medical and biological sciences follow with 14.09 per cent and 13.04 per cent. Agriculture gets just 8.76 per cent and is much below chemical sciences which gets 11.55 per cent of the money, most of which is spent on developing better extraction methods.

- Basic research, the backbone of scientific practice, is losing importance. Of the national science and technology expenditure, 41.7 per cent is allocated

to applied research, 34 per cent to experimental development, 17.8 per cent to basic research.

- In terms of R&D expenditure, the least important priority is environment protection. Defence is allocated the largest share of R&D expenditure at 18 per cent. Development of agriculture, forestry and fishing taken together enjoys only 17.7 per cent. Protection of the environment gets just 3.1 per cent. Space is a priority with 12.1 per cent. Promotion of industrial development was 12.1 per cent. General advancement of knowledge was 11.6 per cent. Development of health services was a meagre 8.6 per cent. Production, conservation and distribution of energy was 6 per cent and transport and communication got just 5.3 per cent.

- With respect to money disbursed to scientific agencies, the Union ministry of non-conventional energy gets a paltry 0.1 per cent. The DRDO gets 30.3 per cent of the R&D pool. The department of space spends 21.3 per cent and the department of atomic energy 12.2 per cent. The ICAR got 13.5 per cent. CSIR 9.4 per cent, department of science and technology 5 per cent. ICMR receives only 1.6 per cent. Department of biotechnology gets 1.6 per cent, the environment ministry only 2.6 per cent.

"We have been trying to link global change research and developmental research," said Thomas Rossewall, executive director, International Council for Science. "But there is a lack of communication between scientists working in these two fields. While scientists have been to an extent successful in communicating warnings about environmental hazards and disasters with the political systems existing throughout the world, I am not very hopeful of change."

Perhaps the best indication that all hadn't gone well at the congress was disagreement over whether the meet had achieved its aims. "There should have been more papers directly related to the focal theme," averred B H Shrikanth, a member of the Indian Science Congress Association. "More papers should have been there on the interphases between energy, environment and economics."

Agreed B R Dubey, department of Botany, Ranchi P G College: "The focal theme lacks clarity. The problem of biodiversity loss has also not been addressed properly." But the organisers defended themselves. "When we talk about energy security and non-renewable energy, we automatically talk about protection of planet earth," said local secretary of the 94th Science Congress Venugopal Menon. "There are sufficient papers on concerns about planet earth," said Sailesh Nayak, Director of the Indian National Centre for Ocean Information Services.

In sum, as Sujit K Mitra, president of the sectional sessions on engineering put it, "Scientists are aware of man-made hazards. Some solutions are also being found but some stakeholders aren't ready to implement it." Is India's scientific establishment one of them? ■