

## Science in India – Vision and reality

In the above article by S. B. Kabiraj (*Curr. Sci.*, 1995, 68, 569–570), a fervent appeal to scientists to change the dismal scenario and build a proper work culture for the benefit of the common man. He says, 'There is so much relevant work already done which needs to be extended by CSIR to the rural areas'. I have worked in CSIR, industry, and university. In today's economic scenario there is greater need for application of science rather than doing science for science's sake. As Angus Duke says in his thought-provoking article 'Develop or decline', 'In truth while basic science may be a useful handmaid to the technologies, she is a bad mistress and a worse ruler', (*Chem. Brit.*, June 1994, pp. 473–474). The Department of Trade and Industry, UK jointly with the Fellowship of Engineering and The Royal Society started an Innovation Lecture Series to 'raise awareness of the importance of innovation in all sectors of business and education com-

munities as well as among the public at large', the inaugural lecture being delivered by Akio Morita, Chairman of the Board of the Sony Corporation on 6 September 1992. His subject was 'S' does not equal 'T' and 'T' does not equal 'I' where S, T and I refer to science, technology and innovation.

Innovation, the successful exploitation of new ideas, has significance not only in business and industry, but in the entire chain of activities leading to it, which includes R&D. A larger part of credit for the 'green revolution' is given to agricultural 'extension' services. In practically every sphere of activity, successful practical results justify the means. Somehow this has not happened for government-funded S&T in India to an extent it ought to have. 'Relevant work' alone is not enough, we need to prove the relevance and this is possible by extension people (call them by any name—workers, scientists, technologists, engineers, facili-

tators, technology transfer agents). They can or should take the 'relevant work' to the field and demonstrate efficacy and benefits. Such an extension activity may need an appropriate management training. We have to market the R&D results already achieved and 'market-orient' our future R&D. This will necessitate development-oriented thinking in the higher educational system and research institutes by reducing excessive interests in the 'R' of R&D and reforming our Ph D programmes. This is a vast subject which needs separate treatment. Nonetheless, the reorientation exercise in no way reduces the importance of research (basic, fundamental or applied) which will have to be continued but in selected areas.

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## University science education: Need for a national agenda

Science education in our universities is in poor shape. Several thought-provoking points have been discussed in the Academy document<sup>1</sup> and in the succeeding comments<sup>2-6</sup> which indicate that university science education in the country is on a track of rapid decline. A relevant question can be asked as to what are the real causes for the decline?

Is it a crisis on the part of leadership and management? In spite of a good heritage of modern science in the post independence era, especially in the Nehru phase, contemporary leaders in science management and more so in University science have not kept pace with world science on one hand, and largely failed in solving various problems in the country on the other.

A comment on the issue<sup>5</sup> simplifies the cause of decline to the poor quality of non-refereed research journals and UGC schemes. Are the selections for the open posts fair and based on the quality of research of the candidate?

Adequate funds, a nice working system,

motivations, rewards and recognitions are, unfortunately not available to committed workers these days. If a person works very sincerely for a decade or so and receives nothing but humiliation in return, what motivation does he get to do good science? In such circumstances certain alternate systems may be considered. An entry in the faculty positions may be regulated by National Entrance Test or more so by the 'Indian University Service' on the pattern of other first rate services like Indian Civil Service examinations, medical services, agricultural services, etc. It will reduce favouritism on the basis of group alignment, caste, creed, regionalism, etc. Introduction of a running grade system for inservice people may be another good way to reduce their exploitations and sufferings in the name of promotions. University teachers once in the service may be given time bound benefits with a reasonable job load. For example, those who are not interested in developing their own projects may get associated with some integrated national

projects in their area of specialization to keep them active and updated.

The role of the universities is to create new knowledge, to analyse existing knowledge and to train human resources required for the development of a modern and civilised society.

Universities as centres of learning should give an opportunity to intellectuals to think and to set good traditions in society. Unfortunately, favouritism in the selection of faculty, external interference, and avoidance of people with specific ideologies are becoming common phenomena day by day. How did the clock start moving backwards?

Senior people in the universities either get involved or surrender to such happenings in the selection committees. The anarchy at each level gives them opportunity to be 'donor' of posts, promotions and benefits and feudal values emerge. Those who are different are crushed in the system.

And now without analysing and discussing about the real causes of deteriora-

tion and the real role of the universities, the infrastructure the country has developed is advocated to be surrendered to the private sector by the supporters of the new economic policy – which will fuel the crisis in the universities and university science.

The germs of this illness can be traced out in the complex character of our society too in which the university system exists. Universities as centre of learning are expected to bring out society up from its traditional evils but somehow social evils have dominated the university system. The remedy is not easy. But further deterioration will lead to the collapse of the system good or bad we have developed with a definite infrastructure.

It needs thorough discussion and participation of each section. Superficial and ill-worked conclusions do not help; rather they will divert the input and energy.

Planning should be drawn to search out motivated people from the masses and not from the elite sections who live in the big cities only for higher education and technical training. General standards of input and output have to be improved countrywide and definite accountability is required to be fixed at each level. Participation of youngsters and people from the distantly placed universities and colleges should also be assured in the decision-making bodies. Most importantly, science education and research should

be well linked to the societal and environmental problems of the country.

1. University Education in Science, Academy Report, *Curr. Sci.*, 1995, 68, 255–267.
2. Tiwari, S. C., *Curr. Sci.*, 1995, 69, 213–215.
3. Sitaramam, V., *Curr. Sci.*, 1995, 69, 89–94.
4. Lal, D., *Curr. Sci.*, 1995, 68, 865–867.
5. Bhattacharya, S., *Curr. Sci.*, 1995, 69, 221–222.
6. Sarkar, P. C., *Curr. Sci.*, 1995, 68, 1001–1002.

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## Intellectual property rights and biological resources

The article by Madhav Gadgil and Preston Devasia on 'Intellectual property rights and biological resources: Specifying geographical origins and prior knowledge of uses' (*Curr. Sci.*, 1995, 69, 637–639) has a significant bearing on the debates relating to the Convention on Biological Diversity (CBD) and the General Agreement on Trade and Tariffs (GATT). Some comments:

1. IPR specifications should include not only a declaration of country of origin (or other source) and known indigenous knowledge (as suggested by the authors), but also proof that the material/knowledge has been obtained in keeping with the provisions of the CBD. This would include:
  - Prior informed consent of the country of origin (Art. 15 of the CBD);
  - Mutual agreement with country of origin (Art. 15); and
  - Consent of local community, if any, from where collected (Art. 8j).

I have, in a note to the CBD Conference of Parties, proposed an International Certificate Regime, in which such declarations are made. However, even before such a regime can be established (possibly as a protocol to the Convention), IPR rules can specify such requirements.

2. The authors' definition of 'country of origin' is problematic (it incidentally came up in a similar form and received heated reactions during the negotiating rounds to the CBD), for the following reasons:

- It appears to suggest that the Convention's provisions should act retroactive-

ly, to which there is vehement opposition not only from industrial countries but even from many tropical countries which have received genetic resources from other tropical countries (for instance, would India be made to pay for coffee/tea/rubber, or Latin American countries for coffee?);

- It does not match with the CBD's, and amendments at this stage are extremely unlikely;
- Some other system would have to be figured out for resources whose origin is unknown or unclear, or whose origin was in a 'country' the boundaries of which now exclude the region of origin (if something originated in what is now Pakistan, who would be the country of origin: India or Pakistan?);
- What are 'components of natural biological communities'; is a wild plant taken from India and 'naturalized' for over a century in, say, Brazil, such a component? Is *Prosopis juliflora*, or *Lantana camara*, now 'naturalized' in India, such a component?
- In case of domesticated/cultivated components, I can understand that the authors want to exclude countries which have received crops/livestock from other countries in the last five hundred years; but what of varieties which have been developed *within* the last five hundred years? These are not covered by the authors' definition.

It was some of the above reasons which led the negotiating parties in the CBD to the simple definition of countries of

origin as those countries which possess the resources *in situ*. By no means is this the ideal definition (especially given that many true countries of origin lose out), but it appears to avoid many of the problems, and is therefore the most acceptable. In the long run, we could consider a less problematic definition, like: 'country where the resource is known to have had its first occurrence, and, in the case of resources for which this is not known, the country where the resource occurs in *in situ* conditions'.

3. There are now several other concrete suggestions for ensuring recognition and returns for local community knowledge, including some form of community intellectual rights, material transfer agreement contracts, and so on. Some of these may be as effective as IPR regimes, and need to be examined worldwide and in India.
4. Finally, I must add that the question of whether IPRs should be allowed on life forms (and biotechnologies) at all is far from resolved; I personally have several ethical and socio-political reservations, and my comments above should not be construed as a fundamental acceptance of such IPRs. Any further debate on the above could perhaps touch on this aspect as well.

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