

'Biotechnology chakravyuha': Biotechnology education in India

The aim of biotechnology education and R&D is to find solutions to identified problems, like pest control, nutritional enhancement, an improved drug, a vaccine or an antibody, etc. Over the last decade, a plethora of biotechnology courses have been started at the postgraduate level by the Government and non-government organizations. A large number of students are being enrolled, the fee structure is quite steep and is affordable only by those from rich families or those who can afford to take an educational loan. Most of these courses are run by institutions without adequate and appropriate infrastructure, in terms of class and laboratory space, equipment, library, adequately qualified teaching staff, etc. When one looks at the outcome of these courses, it seems that there is something amiss. This is reflected by the widening gap between biotechnology ventures and availability of skilled technical workers or researchers. There is lack of qualified faculty, resulting in

students with low aptitude both at the level of concepts and technology. Certain aspects like projects, practical training and on-the-job training are not feasible with about 3000 students admitted each year.

This major lacuna in the education system became a boon for business-oriented people. The result is the birth of innumerable biotech companies in various states of the country. These private players started cashing in by offering practical training courses and also getting the project work done by the students of PG course as well as by students of the M Phil degree. With the enormous financial burden on their parents, several students attend these courses to acquire various jobs in the biotechnology market. However, the scenario inside many of the biotech companies is quite astounding. PG students are hired by these companies on low salaries to train the new students, a money-making venture in the name of biotechnology.

In the name of progress, are we entering a 'Biotechnology chakravyuha', where a number of people are being trapped, thereby affecting the overall human resource development with actual dearth of highly technically trained personnel? A high-powered national statutory body must look into the rules and regulations for technical training by biotech companies and by the various Government and non-government organizations. The 'biotechnology chakravyuha' can be broken only by imparting proper training to teachers through regular refresher courses and also by creating an academic audit to establish the credibility and meaningful future of biotechnology in India.

RITA SINGH

*Department of Zoology,
University of Delhi,
Delhi 110 007, India
e-mail: ritas@zoology.du.ac.in*

Publication charges

The mandatory 'publication/page charges' demanded by some journals for publishing scientific papers has been a contentious issue for most Indian institutions and scientific departments. The official policy is that publication charges are not to be paid, save exceptional (!) cases.

Journals which levy publication charges are invariably the best ones in the concerned fields and which are most referred to by research workers. The publication charges policy is in vogue mainly with American journals.

This does not necessarily mean that *all* the journals which do not charge for publication are of poor quality. *Nature*, with an impact factor of ~30, does not charge for publication.

The basic policy of the American Professional Societies (who publish the journals) is to generate their own funds. In contrast, in India, UK, USSR, Japan and many European countries, the Government is directly/indirectly funding the publication of journals through grants to professional Societies or Departments (like CSIR journals, IMD journal, etc. in India).

Thus, journals from India, Europe, etc. do not have publication charges.

To get around the problem, the following methods are being adopted by Indian researchers:

(i) Do not send papers to such 'page-charging' journals. Instead send papers to Indian/low impact foreign journals (there are quite a few).

(ii) Present the results in conferences or publish them as scientific reports (un-refereed).

(iii) Plead with the journal editor after acceptance of the paper for waiver of publication/page charges.

The guidelines for publication of papers were probably framed when we had a crunched science budget. Possibly before the 1960s, not many journals were charging the authors for publications. Besides, UK journals were much sought-after.

During the last 20–25 years, there have been occasional demands to review this policy by scientists who consider it to be highly detrimental to good work.

There have also been attempts from time to time by senior scientists to improve the standards of Indian journals by publishing in them. Some new journals were also started in the 1970–80 to set higher standards. None of these strategies have worked in the long run. Except for stray instances, no good papers are sent to Indian journals – even by well-established Indian scientists.

During the last 10 years, things have changed for the better in the economic sphere in our country, forcing us to have a fresh look at the 'publication payment' policy. The R&D budget of science departments has increased substantially. The Foreign Exchange (FE) position has also improved dramatically with the rupee becoming stronger. So finance is not much of a constraint any more in this issue.

The average publication charges for a scientific paper (of around ten pages) in a good *AGU/AMS* journal would be about US\$ 1500, i.e. around Rs 60,000. Can't a scientific project of Rs 5–10 lakhs, afford paying for publication of

two/three good papers in reputed journals? This works to ~20–25% of the project cost, and is the most important element of the scientific project. The investigators could include a separate item in the project budget as 'publication charges'. If publication of project results in reputed journals is insisted upon (by permitting payment of publication charges), it will put requisite pressure on scientists and motivate them to bring out their best.

Presently, many scientists are taking advantage of the 'no publication charges' financial guidelines of the Government, and are able to get away publishing their results in low impact Indian and foreign journals/conference proceedings/unrefereed project reports, etc.

It is high time that the Government of India gives blanket approval for the payment of publication charges wherever required by scientists. It should be in-

sisted that all major works be published in relevant/high impact/reputed journals, notwithstanding publication charges.

M. S. NARAYANAN

*National Atmospheric Research
Laboratory,
Gadanki 517 112, India
e-mail: u.m.s.narayanan@gmail.com*

Perplexing ground realities

Most of us are driven by an insatiable urge to do good – largely to those who are perceived as being deprived. And it is often this urge that drives us to take up initiatives which are beyond our own sphere of work. Hence many devote their time and energy in upgrading the quality of remote rural schools, while others organize fora to popularize science and technology amongst the rural and tribal populations of the country. The Tamil Nadu Science Forum is one such example. Then there are others who innovate and provide technological solutions for improving the quality of life, and these are predominantly visible in the agricultural sector.

However, just as there are many standing examples of the success of such innovations, there are an equal or more number of instances where well-established technological solutions have failed. And lack of efficacy of the solution is not always the reason for failure.

Two cases in South India amply illustrate this confounding issue. The coastal districts of Kerala, notably Ernakulam and Alapuzha are severely deficient in potable water due to the fact that large portions of the districts are part of the brackish water system. Dotted this landscape are villages that are rather unique, being named after the predominant plant species. Anthropogenic factors such as coconut retting, small industries that are not strictly regulated, and the recent influx of small aquaculture initiatives further aggravate the condition. The non-availability of potable water within domiciles has increased the labour of women collecting water and has also rather significantly impacted the general health of the com-

munity through repeated bouts of waterborne diseases and occasional toxin-related fatalities. About 66% of the total water supply comes from the Kerala Water Authority piped water, which is not reliable, particularly in summer. 33% comes from tanker lorries that deliver drinking water, which is unaffordable to a majority of the population. One per cent is groundwater sourced from wells. To specifically address this problem, the Welfare Society, Ernakulam, which is a church-based organization started a project of rainwater harvesting in April 2003, covering two major villages of Ernakulam, viz. Cherthala and Pallipuram. If the notion was simple, so was the project structure and implementation. Using ferro cement tanks of varying capacities, rainwater is collected into the tanks through a basic filter of charcoal, pebbles and net from rooftops through pipes. The tanks are built with a single outlet and there are provisions for cleaning. The project was operationalized on a mutual contribution mode. Each household had to pay Rs 3000, which was matched by a grant from the Welfare Society. Periodic visits and training sessions were used to support the project. Today, the initiative has not only sustained itself, but has also spread to adjacent areas with the local Panchayats absorbing the idea in their plans. Institutions, notably colleges and schools have also taken up the initiative.

The second case is an initiative to improve the livelihoods of the fishing communities, notably women who were severely impacted by the tsunami of 2004. Located in Tamil Nadu, the project sought to enhance the scope of traditional fish

drying and trading, which is exclusively handled by women. After a year's effort of community mobilization and a number of hands-on training sessions, 12 women's groups were formed and through a completely participatory process, a solar dryer that could dry 100 tonnes of fish was located within the village. The initial period of enthusiasm soon disappeared and the feedback received was one of discontent and rejection. It was rather intriguing, since the dryer not only reduced the drudgery of women, but also provided good quality dried fish. Further, there were no operating costs. Why then did the village reject the dryer? The answers were quite perplexing. The first of these was the 'efficiency' of the dryer, which completely removed the moisture from the fish. This was against the local practice of allowing some moisture to remain to maximize the weight. Perfect drying was bad local economics. Other reasons cited were equally confounding, reiterating the fact that decades of community work can still be just as confusing as it was on day one.

ACKNOWLEDGEMENTS. I thank Fr. Paul Moonjeli of the Welfare Society, Ernakulam for facilitating the visit to the project site and providing details.

JAYSHREE VENCATESAN

*S. Ramaseshan Fellow,
Care Earth,
No. 5, Shri Nivas, 21st Street,
Thillaiganga Nagar,
Chennai 600 061, India
e-mail: jvencatesan@careearth.org*