Role of higher education in the Third World

David E. Bloom and Henry Rosovsky from USA (*Curr. Sci.*, 2001, **81**, 252–256) have highlighted the role of higher education in the future development of Third World countries, including India. The Task Force on Higher Education and Society (TFHE) kept three interlinking factors in view: first, the burgeoning demand for higher education; second, the growing importance of knowledge in the modern world and third, the impact of globalization. TFHE has brought out the strengths and weaknesses of the higher education system in India. While some of our top scientific institutions are comparable with the best in the developed world in scientific productivity, but they are also considered as exceptions to the rule. Leaving aside IITs, most of our universities produce poor quality of research work and our post-graduate (M Sc) degrees are considered equivalent to Bachelor's degree only in USA and Europe. India is far below USA, Europe and Central Asia, and only comparable with African countries, in the matter of enrollment to higher education.

It is observed that most of the Third World countries offer poor-quality programmes in higher education, viz. teaching by poorly-qualified, poorly-motivated and poorly-paid faculty, lack of infrastructure and outmoded curricula. Due to the high demand for university degrees in India, the All India Council for Technical Education (AICTE) allowed entry of the private sector into the domain of higher education in engineering, management and information technology. This opened floodgates and as a consequence resulted in mushrooming of poor-quality institutions and lowering of standards. Punjab Technical University, Jallandhar has neither faculty nor its building, but opened more than 80 centres of higher education in association with some computer companies, in a mode being popularized as franchise system.

The University Grants Commission (UGC) and the Ministry of Human Resource Development (HRD) have also encouraged the entry of NRIs and multi-nationals to set-up private universities in India. No doubt, in USA all the best institutions are managed privately, but in India accountability does not exist. Even the National Accreditation and Assessment Council (NAAC) set-up by the UGC to evaluate the performance of Indian universities has failed in its mission. Only the Medical Council of India (MCI) has set-up high standards for recognition and affiliation of medical colleges. Manipal Medical College stole the show and became the first privately-funded and managed university in India, with its campuses in Sikkim and Bhutan.

The TFHE report is an eye-opener for the HRD Ministry and the UGC. Some of its conclusions are noteworthy:

- Higher education must be planned properly. The proliferation of private institutions is doing little more than preying on the aspirations and assets of well-intentioned students and their families.
- The practice of draining, training and retaining the best brains of India, the products of our IITs in USA, is a clear set-back to science and technology development in India.
- Good governance and a systems approach are the need of the hour for promotion of higher education in India.
- The biased view of Indian economists and planners that higher education provides a lower return on investment than primary and secondary education must be overlooked, if not outrightly rejected.
- Higher education has enormous potential to promote prosperity among Indian people, irrespective of their social origins.
- Academic freedom, autonomy of academic institutions, meritocratic selection of faculty, Vice-Chancellors and Directors of research institutions and monitoring the progress and accountability of higher education institutions are essential for tapping the vast human resource potential of India.

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Physics research as an avocation?

Physicists generally recognize that we are, at the school-leaving stage itself, losing bright students to other vocations. While it is very important to change this scenario (and efforts like KVPY should bear fruit), I pose here the following questions. If we encourage physics research as an avocation, would bright young persons be willing to do physics research in their spare time? If the answer is yes, how can we support an 'avocational' research physicist (ARP)?

This discussion is initiated in the belief that bright youngsters would be keen to do research as a hobby for the same reasons for which many of us do it as a vocation, viz. for creative pleasure, and in the hope that some work of ours will leave a lasting impact. Even to a 'vocational' research physicist (VRP), archival citations are more satisfying than quick citations. And an entry in a standard textbook would make it all worthwhile! Since only a small fraction of our papers are cited ten-to-fifteen years after they are published, an ARP who publishes less can have the same lasting impact as a VRP. There are, of course, well-known examples of outstanding physicists who had started as part-time researchers. It would probably not be difficult to motivate bright students to become ARPs.

During the initial years, a young ARP would need to be trained in doing research and would aim to meet norms for a Ph D (albeit on a somewhat longer time scale). We have to evolve a procedure by which potential ARPs can be selected and then supported by helping them find a guide. For this student–guide interaction, e-mails would be the normal mode of interaction. Scholarships would not be involved because an ARP would be doing research as a hobby and not as a part-time job. Nevertheless, some minimal logistics support must be offered.

The ARP can be expected to spend ten to twenty hours per week (the kind of time that some would spend on a hobby) and this should be used by the ARP to do recommended reading, work out problems, and do some literature survey. For this, the ARP needs to be registered with a research institute so that he (or she) can have access to its library, and electronic access to the journals subscribed to by that institute. This support must be provided gratis to selected ARPs.

We can expect an ARP to spend two to four weeks each year doing full-time research. Theorists would be interacting productively through regular e-mails and the internet, and this period of intense interaction would ensure completion of work on a problem. Even for experimentalists, this time period equals a few instalments of beam-time on a major experimental facility and this period of dedicated work could lead to one good publication per year. I believe that such short visits to small laboratory facilities can be equally productive, as appears to be happening at IUC-DAEF, Indore. Funding agencies would need to explicitly provide support to this activity of ARPs in terms of travel costs and contingency lab expenditures.

The third support required is from academic peer groups which must help by regularly identifying outstanding problems whose solutions are likely to leave an impact. This could be done, say once a year, through workshops and newsletters that would correspond to less-ambitious versions of V. L. Ginzburg's 'Key problems of physics and astrophysics'. Arranging such overviews from active and outstanding physicists will require some effort.

Finally, I feel that 'physics research as an avocation' can be promoted with minimal but focused support. It would allow bright minds to pursue viable research while pursuing their chosen career. Besides inducting bright minds into the research stream, it would allow some of these ARPs to smoothly switch to full-time research later in life.

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Amte's silent revolution: A possible anchor for the bewildered R&D in agriculture

A sobering three-day trip to Anandwan and a few other projects of Amte, exposed me to the environment-friendly agriculture-based integrated commune development experiment that was initiated by Baba Amte, more than four decades ago. I was only a passive listener when the genius of Vikas Amte, a medical doctor, a seismologist, an architect, an agriculturist, a hydrologist, a biogas expert and, above all, a very sensitive environmentalist, all packed in one, enthusiastically described the projects, as he drove us haltingly along the edge of numerous ponds and fields in a jeep. We were a team of four scientists from the Bhabha Atomic Research Centre (BARC), Mumbai who thought it was worthwhile to explore the possibility of giving the benefits of our R&D to such a noble organization.

A number of cured leprosy patients, with their limited resources, run the village and the numerous farms, fisheries and industries in various projects of Amte with exemplary efficiency. But the taboo outside forces them to burden the organization, as they age and gradually become nonproductive. The private donations coming from philanthropists of the West for this effort indicate that they are more sensitive than the Indians. It is in this context that inputs from our R&D laboratories directly to support such sincere efforts, make sense.

I wish to raise several questions against this background. I want to ask the agricultural scientists who claim to do applied research in agriculture and related fields, what is it that did not allow the permeation of the fruits of their research activities to Anandwan that was developed from a piece of arid land into a lush green farm by the efforts of cured leprosy patients under the direction of Baba Amte, using the traditional crops and agronomic practices for more than four decades now? Who are being benefited, if at all, by these researches?

I also want to ask why Indian scientists are always found napping when the rest of the world moves ahead and claims patents for basmati, neem and haldi? Why is it that we cannot think of research to develop the likes of terminator technology to compete with MNCs' effort, or match by devising still newer technologies, and stop crying helplessly when GMOs are introduced in our fields? And why do our scientists and technologists feel elated simply by winning legal battles whose codes are decided elsewhere, instead of winning them in laboratories and experimental fields? Where is all the creativity and spirit of innovation that would be expected of the world's third largest scientist community, which exports perhaps the largest volume of intellectual property in the form of trained personnel, just because we do not know how to employ