

## Fate of higher education in India

Ashokan<sup>1</sup> has deplored the state of higher education in India. University Grants Commission (UGC) and All India Council for Technical Education (AICTE) have encouraged the privatization of general and technical education respectively. The quality of higher education has deteriorated due to mushrooming of private educational institutions for commercial purposes, to generate income through capitation fees running into crores.

For paradigm shift in the evaluation of teachers and institutions, the following are desirable: (i) UGC guidelines for

evaluation of teachers must involve students in the process of internal assessment as prevalent in the universities of the West. (ii) Institutions must be assessed on the basis of performance in the field of teaching and research using qualitative and quantitative techniques as developed in the West. (iii) Academic staff colleges run by UGC have failed in their mission to improve standards of higher education in the country. Their performance must be reviewed. (iv) Credit must be given to good teaching abilities and research output of teachers at the time of

internal/merit promoting. Refresher/orientation courses have failed to improve the situation. Such courses should be made more useful.

1. Ashokan, K. V., *Curr. Sci.*, 2004, **86**, 1053.

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## Biotechnology 'off the shelf'

Biotechnology is one of the technologies available to us 'off the shelf'. It can improve our quality of life in many ways, both now and in the future. Among many uses of biotechnology, food and agriculture applications are of particular interest to humankind. Biotechnology has the potential to deliver significant benefits to: (i) consumers, who seek better quality, better tasting and more nutritious food with improved protein contents, (ii) farmers, with efficient methods to grow crops with less impact on the environment and to reap bountiful harvests from existing land, (iii) developing countries seeking solutions to help feed a growing population. Increased local food production in developing countries can contribute to lower food costs and enhanced food security.

Plant breeding practised over several centuries has produced crop cultivars that sustain humankind. Development of novel biotechnological tools of direct gene transfer, in the last decade and a half, has added new dimensions to plant improvement programmes. The development of 'first generation of crops' (input traits such as insect and pest resistance) and 'second generation of crops' (output traits like enhancing the nutritional level) is the accomplishment of biotechnology. Biotechnology accelerates and also rationalizes traditional breeding techniques.

It has some appealing properties for developing countries.

High input agriculture incurs high costs for agrochemicals and water. Biotechnology-based solutions could reduce demands for these resources. This approach could also reduce deleterious effects of diseases and weeds, thus promoting sustainable agricultural production in Third World countries. Several countries are already putting in place structures and capacities for research and development in biotechnology.

One of the best uses of biotech crops is that it helps farmers to increase their use of no-till farming practices. This in turn reduces soil erosion up to 90% in certain instances. Considering the fast run-off of soils in many countries, usage of such biotech crops will be appropriate. Biotechnology could help developing crops with self-protecting mechanism, thus reducing the use of chemicals for crop protection. For example, a protein that helps control the larvae of certain harmful insects feeding on plants can be developed in genetically modified corn, potato and cotton, which are some of the major staple and cash crops. Biotechnology has great potential to reduce our reliance on chemical pesticides. In many regions, agricultural productivity is limited because of harsh environmental conditions, e.g. saline soil, poor water condition

or drought. Development of drought-resistant varieties or those tolerant to low-quality water, again, may increase yield.

However, we should keep in mind that biotechnology is not the only solution to all problems that Third World countries are facing today. Modified varieties may be appropriate in some regions, but not in others. Introduction of biotechnology should not cut short the existing alternative techniques that may increase agricultural productivity. Actually, in both developed and developing countries, new genetic engineering techniques can complement and increase the precision in cultivation and production. We need to understand location variability and develop techniques that will generate differentiated varieties across locations to adjust to specific conditions, and biotechnology can play a crucial role in providing the diversity of varieties needed. With genetic engineering, it may be possible to develop varieties or plants that can serve as biological indicators and also provide farmers information about soil conditions. Technologies which have the potential of increasing productivity and sustainability simultaneously, have to be identified and promoted. A bio-economic model<sup>1</sup>, can combine socio-economic factors influencing farmers' objectives and constraints with biophysical factors affecting production possibilities and the