Funds for higher education

The Nobel Laureate Amartya Sen made a statement in a function at Delhi University (*Hindustan Times*, 16 November 1999) that there is no shortage of funds for higher education in our country. This may sound somewhat strange since many educationists in the country think otherwise, and more so for science education. However, when an authority on economics says something about funds and education, our attention is invariably drawn. One may not be able to appreciate the statement on its face value but going into the depth of it, reveals the essential requirement for excellence. If one stretches the philosophy of Sen a little more, one will find the statement to be true for scientific research also, since it is the will, determination and planning that matter more than funds for scientific research. C. V. Raman discovered the Raman Effect and won the Nobel Prize in Physics in 1930 at a time when there were no good experimental facilities in the country. Hence it is obvious that determination and hard work are more important in scientific research.

A comparison of the content and quality of the research work done in general in our country with that in the US and other advanced countries would lead us nowhere. Complaints or regret about lack of resources in our country would only imply an inferiority complex. The basic question is: Do we do our best with whatever resources we have? The best effort would not only give us the satisfaction but also the strength and inspiration to improve our resources.

There is one more aspect to Sen's statement and the available funds for scientific research. It is about the expenditure on items irrelevant to research. There are several UGC/DST projects or University establishments in the country where this can be seen. Sen might have visited one such institution which provoked him to make such a statement.

There is yet another interpretation to Sen's statement. Almost eighty per cent of the budget in the Universities is spent on salaries of teachers and other staff. And about ten per cent is consumed as overhead expenses including maintenance. Thus only about ten per cent is spent on educational aids, chemicals, equipment, etc. The problem is not the shortage but management of funds.

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Future of science in India

This has reference to a recent editorial in *Science* about the future of science in India (Rao, C. N. R., *Science*, 1999, **286**, 1295). There cannot be differences of opinion to the views expressed in this editorial that allocation of funds for scientific research in India should be at least 2% of GDP and there is a need to carry out research programmes in Science & Technology that focus on the minimum basic needs of the common person and on the promotion of sustainable development which will provide meaningful employment, particularly in the rural areas.

If academic scientists and institutions focus attention on research efforts directed towards the welfare of the society, the political leadership cannot afford to ignore academic science in India. This has been amply realized in the case of some eminent scientists of our time. For example, the efforts of A. Kalam (Space and Defence), M. S. Swaminathan (Agriculture) and Kurien (Dairy Development), are very well appreciated by the political leadership, the society and the media. So, it is for the academic scientists to come forward to direct at least a portion of their research efforts towards solving problems of interest to our society and to demonstrate to the political leadership that they do care for the needs of the country and hence deserve support of the Government for their research efforts.

Finally, in the long run, even the world bodies would appreciate Indian work only if it is useful to the society. For instance, it is doubtful that the western economists would have appreciated if Amartya Sen developed an 'elitist' economic theory instead of giving the world his welfare economics objective: 'Though raising economic growth is important, the ultimate objective must be to expand the ability of most sections of the population to earn a decent living'.

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MKU's initiative in university–industry interaction

I read with interest the editorial 'Conflicts of interest'[1]. It is true that many of our universities have not undertaken consultancy work to foster the interaction between industries and institutions; the scenario is changing now. In this connection I wish to briefly state the activities of Madurai Kamaraj University (MKU) in this area. For effective university–industry interaction, MKU has constituted an Industrial Consultancy Group (ICG), with the Vice-Chancellor as Chairman and with one of the scientists as the Secretary in addition to some members from industries and academics. The Secretary will identify a suitable faculty/school/department for any service required by the industries. The MKU–

ICG has offered consultancies to several major industries, government organizations and small-scale industries. The Schools of Biological Sciences, Biotechnology, Energy, Environment & Natural Resources and the Departments of Materials Science and Sociology have solved several problems of different industries. In recent years many industries have sought the help of the School of Biotechnology. MKU has formulated well-defined guidelines for undertaking consultancy work. The faculty members who have been involved in consultancy work have not compromised on their academic responsibilities so far.

Realizing the importance of 'information technology', MKU has recently signed MoU with the Electronic Corporation of Tamil Nadu (ELCOT) to set up a technopark in the university campus. This will pave the way for several entrepreneurs to develop software for export market. Needless to say that such an interaction will also provide job opportunities for several people.

1. Balaram, P., *Curr. Sci.*, 1999, 77, 1381–1382.

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Impact and imprint of Orissa supercyclone

A cyclonic storm battering the east coast (called the Coromandel coast) is a common meteorological phenomenon during the SW and NE monsoon periods. Storms are 'abnormal weather systems' with unpredictable movement originating in bay islands in the Indian Ocean. They originate in the open sea initially as low-pressure areas and then gradually increase in dimension and intensity, as depression, storm or cyclone depending upon the energy and speed of the abnormal weather system. Since the Coromandel coast falls within the tropical cyclone tract, there is no escape from the fury of nature. The east coast is generally deltaic, with more bays and underlain by thick pile of sediments than hard rock, and hence is more vulnerable for impact as the entire coastal tract is without any physiographic eminence.

As the sea is said to be a consumer of sand, wherever the coast is more sandy and underlain by sedimentary strata, the impact and damage is worst especially between Point Calimere and Nagapattinam (Tamil Nadu) Ongole and Chirala (Andhra Pradesh), Bhubaneswar and Paradip (Orissa). The abnormal weather systems are usually associated with high velocity wind and heavy precipitation and normally the cyclones get dissipated only after crossing the coast. The configuration of the coast more or less controls the movement of the cyclonic storms and their destiny. From the coastal geomorphologist's point of view, only tidal marsh, beach ridges and dune complexes ranging in elevation between 0 and 20 m for a stretch of 20 km from the coast towards inland are seen in the coastal tract. Such low relief landforms cannot withstand the fury of 'megaton energy' weather systems with rain and wind.

Before the imprint of the cyclone devastation gets obliterated, it is essential to have sequential aerial photographs of the devastated terrain, so that the imprint of the cyclone can be clearly demarcated and a photomosaic map can be prepared which can be utilized for future mitigatory and long-term planning. Even with advanced technology and sophistication through satellite imageries, to track the movement of the weather system, the habitants are caught unaware to face the fury and deluge, owing to the unpredictable movement of cyclonic storms. In addition, the coastal tracts are normally unapproachable due to poor communication systems and it becomes very difficult to evacuate people during a cyclone. This calls for a multidisciplinary, long-term coastal disaster management system and study to withstand the fury and mitigate the loss to both life and property.

It has been reported from the impact of recent cyclones that modern constructional and architectural codes could not withstand the fury, while ancient rocks made of laterites and khondalitic rock were intact. This calls for a new code of architecture to be adopted for dwellings in the coastal areas. Perhaps the Orissa supercyclone has been the worst of its kind. Detailed large-scale photomosaic of the devastated terrains has to be made immediately for long-term mitigatory measures.

The coastal environment is a fragile dynamic ecosystem and hence is more vulnerable to erosion and cyclones. The challenging situation posed by the dictates of nature cannot be solved overnight by constructing a sea-wall along the low relief coastal stretch but can be alleviated or mitigated only by human will and endurance, with tolerance and adaptation.

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