Revitalization of research and teaching in India – A mirage

The decline in quality and quantity of research output and falling academic standards in higher education in India are once again receiving attention. Borrowed ideas like 'contractual teaching' are being floated by the policy makers. If we reflect on the past, then it would emerge that since independence a typical mind-set of the so-called eminent scientists/academicians has dominated the Indian system, and this is a confluence of the worst from the West (specially the US) and from India (e.g. hypocrisy and feudalism). Since the same mind-set is behind the current policy reforms, revitalization of research and teaching would remain a mirage. The young generation which takes pride in intellectual slavery, also does not hold promise for the future. The likes of B. P. Radhakrishna, who have firm faith in the Indian ethos[1] are rare, and marginalized. Here, I would like to draw attention to the rot in the American system that has been imported by US-returned or trained scientists in India.

David Hestenes, a professor of theoretical physics in his Oersted Medal Lecture recounts his experience that illustrates 'reward of the denial of tenure' to an untenured faculty who attempts teaching innovation of any kind[2]. In 1979, Hestenes participated in a debate about whether teaching is science or art[3]. The reader is invited to study this article with an open and questioning mind, however, here I quote some relevant parts in connection with the present theme:

'The professor frequently complains about the weak background in science and mathematics which his students bring from high school, but how much of the fault is his own? . . . The generally unsatisfactory condition of science teaching and curricula in the school reflects the condition of science teaching in the universities. . . . Though teaching and research are said to be of equal importance, mediocre research consistently gets more academic rewards than good teaching. . . . For the typical professor, teaching is an affair between himself and the blackboard. . . . After all, "anyone can teach who knows the subject and takes the trouble to work up a decent set of notes". . . . Attempts at educational innovation are more likely to be penalized than rewarded in a university. The professor's idea of innovation is an occasional new topic or new course.'

George Polya, a distinguished mathematician, makes the following observations in his letter[4]: 'A faculty member who teaches mainly graduate students must prepare them for research and so he has the duty to keep contact with the contemporary research and cannot let his own research get rusty. Does he do his duty? How can we judge it? . . . to extend to his case the "principle" of "publish or perish" is unwise and unjust. Under stress – and just for prestige, without real love or interest, the faculty member finally produces a paper that is printed and immediately submerged, unread and unnoticed, in the ocean of the overproduction – is not such an effort misguided? Another way of not getting rusty is to pose and solve problems – and it is in my opinion, in many cases a better way.'

The description given by Hestenes and Polya in the American context vividly represents the Indian scene. It is possible that it is only the proportion of such a condition that distinguishes the US from India, and that the US system has the strength to value strident criticisms, unlike in India where critics are ousted from the system.

1. Balaram, P., *Curr. Sci.,* 2003, **84**, 1379–1380.
2. Hestenes, D., *Am. J. Phys*., 2003, **71**, 104.
3. Hestenes, D., *Phys. Teach.*, 1979, 235–242.
4. Polya, G., *Am. Math. Mon.*, 1973, **80**, 73.

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Agriculture based on Vedic wisdom cannot feed the billions

In the commentary entitled 'Paradigm jump in Indian agriculture: natural or coercive', Tiwari[1] has praised the agrarian tradition of India based on Vedic wisdom. The fundamental guiding principle of the same as stated by the author 'is minimum disturbance to equilibrium in nature, and harmonious living'; and 'cow-based agriculture and care for the sentient and non-sentient beings'. As a philosophy this may be the ideal, but the historical facts indicate that agriculture, as practised in the past was not able to feed even less than one-fourth of the present population of India. The first census reported a population of 236.7 million for undivided India. Famines were recurrent in the country (Table 1), and millions were dying periodically due to hunger, even though the population was stable with both high fertility and high mortality. After the great famine of 1876–78, the Famine Commission was appointed by the British rulers; a dozen such commissions followed. The Royal Commission on Agriculture was appointed in 1926. Yet, there was Bengal famine of 1943.

It is only the Green Revolution technology package, including cultivation of high-yielding, fertilizer-responsive cultivars, nutrients, pest and disease management that has prevented major famines since the mid-sixties. The present overflowing buffer stocks, and export of rice and wheat are the result of this techno-

Table 1. Major famines in India

Year	Name
1148–59	Eleven-years famine
1344–45	Great famine
1396–1407	The Durga famine lasting 12 years
1769	Famine
1769–70	Great famine in Bengal – 10 million people perished
1790	The Chalisa famine
1790–92	The Doji Bara or Skull famine
1838	Intense famine in North West Provinces – 800,000 perished
1861	Famine in North West
1866	Famine in Bengal and Orissa – 1 million perished
1869	Intense famine in Rajasthan – 1.5 million perished
1874	Famine in Bihar
1876–78	Famine in Bombay, Madras and Mysore – 5 million perished
1897	Famine in India
1899–1901	Famine in India – 1 million perished, 4.5 million on relief works
1943	Bengal famine – 1.5 million perished.

Source: Ref. 2. Only famines of the Indian subcontinent are listed above. Out of 34 global famines listed from 436 BC to 1962, 16 are for the Indian subcontinent.

logy. Indeed, a significant achievement for the country that was accepting 10 million tons of wheat from the US under PL 480. The nation should be grateful to those who made the technology available, the Indian agricultural scientists for its rapid validation, and farmers who adapted it. All technologies have some shortcomings that can be rectified by new scientific inputs, and further improved upon. However, there can be no reverting to the traditional, low-input, animal-based or organic agriculture with no chemical inputs. It cannot feed the present population of billion plus, and more that will be added before the population hopefully, stabilizes. Extensive diffusion of the existing technologies, incessant adoption and development of new technologies are a must to keep food production ahead of the needs, and boost exports of the farm products and agro-based industries.

1. Tiwari, S. C., *Curr. Sci.*, 2003, **85**, 578–581.
2. *Encyclopedia Britannica*, 1964, vol. 9, pp. 58–59.

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MNCs strategies

Reading through Tiwari's commentary on the paradigm jump in Indian agriculture[1], one is reminded of an old Tamil adage: 'You bring the whole grain; I will blow off the husk and you take it. I will keep the remaining'. This is what the MNCs have been practising for years with the developing and poor nations.

1. Tiwari, S. C., *Curr. Sci.*, 2003, **85**, 578–581.

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Bathynomus giganteus: A rare occurrence in coastal waters of Thoothukkudi, India

A giant isopod was caught in the fish catches from Thoothukkudi coastal waters at a depth of about 300 ft on 16 February 2003. It was identified as *Bathynomus giganteus* A Milne Edwards, 1879 (Figure 1 *a* and *b*). It measured 26.0 cm in length and 9.5 cm in breadth. This species is a deep-sea dweller, found normally at a depth of about 1200–2000 ft. Occurrence of this giant isopod in the inshore waters of Thoothukkudi coast is a rare record.

Isopods belong to the order Isopoda of the class Crustacea. The normal size (length) ranges between 1 and 5 cm. This order contains about 10,000 species living in all major habitats–marine, freshwater and terrestrial[1]. The giant isopod, *Bathynomus* spp. belongs to the family Cirolanidae of the sub-order Flabellifera. This deep-sea form usually lives in waters at 9°C (ref. 2). There are a number of giant isopod species belonging to the genus *Bathynomus* such as *B. giganteus*, *B. dodereini*, *B. affinis*, *B. propinquis*, *B. docemspinosis*, *B. miyarei*, *B. kapala*, *B. immanis* and *B. pelor*[3]. They are commonly distributed in the United States and Japan.

The giant isopod is a carnivore, feeding on fishes, sponges, shrimps, copepods, nematodes and radiolarians[4]. It has no distinct carapace. The first thoracic segment is fused with the head. Body is depressed. Eyes are sessible. Antennules are uniramous and the exopodites of the antennae are reduced. The first pair of thoracic appendage is specialized as maxilliped and the rest are alike, without exopodites. The abdomen is shortened and its segments are often fused into a caudal shield. The pleopods are typically biramous, with flat rami serving as gills. The uropods and telson form a fan-like fin, and the legs are natatory. Gigantism is