

Funding research in India: A boon or bane?

In India, not much funding is allotted for carrying out fundamental research in educational institutions, especially graduate-level institutions. There are very few funding agencies in India such as UGC, CSIR, DST and AICTE. Since our government has drastically reduced grants for carrying out research activities, these funding agencies cannot allocate sufficient funds to educational institutions. Further, in some of these funding agencies, the authorities restrict funds to a few select areas only. As everyone is aware, many educational institutions – government, government-aided and self-financing – have introduced postgraduate and research programmes. However, these institutions suffer lack of adequate laboratory facilities required for advanced research activities. Despite the knowledge, drive, potential and motivation, the Indian youth miserably fail in research activities, because of inadequate funding. It is very saddening to note that our country is losing young, energetic and research-oriented students, since they migrate to foreign countries where the universities are supported by well-equipped research laboratories.

There is no meaning in blaming these students who are going abroad for higher studies (brain drain) without providing even the basic needs to support their higher studies in India. Our government has to take keen interest in providing adequate funds to carry out research activities in the field of science, since the development of any nation is based on fundamental research activities in the field of science. We

sincerely expect our government to learn from well-developed countries about how much priority it should give to fundamental research activities in science. In fact, the country is losing a competitive edge in the world because of improper utilization of scientific resources and the strength of young scientists.

We wish to cite a few examples to suggest to our funding agencies how to manage and allocate the funds they obtain from the government for proper utilization. For example, AICTE, New Delhi, a major agency providing grants to engineering and polytechnic institutions in the country in order to promote science and technology could provide less than Rs 10 lakhs only (for both recurring and non-recurring) for R&D and TAPTEC (thrust area projects) programmes. As well known to everybody, any R&D/TAPTEC programme will require costly, high-tech equipments, mostly imported from abroad.

It is not correct in blaming the principal investigators and coordinators for not submitting their project details on time. For multifarious reasons, the project work gets delayed. First, the coordinators are not sure whether they would receive their grants from the funding agencies in time or not. Secondly, funding agencies do not sanction adequate funds as required by the coordinators for their projects. Further, they do not grant money in one full payment but in three or four instalments. Under these circumstances, no coordinator can manage the available funds for his/her scheme and utilize the

same in buying instruments, chemicals, etc. on time.

When money less than the required amount is sanctioned, scientists find it very difficult to procure their sophisticated equipments. Hence they are forced to go in for lower and substandard versions or other low cost equipments from local manufacturers. These instruments often fail to provide accurate results and frequently undergo repairs. Also, local service personnel are not available to rectify these instruments on time and finance does not allow one to repair the equipments with trained personnel from professional organizations. This trend seriously affects the quality of research that is being done.

The authors very much expect the funding agencies to understand the difficulties involved in carrying out research activities. Under these circumstances, the funding agencies must take adequate measures to solve the above-stated problems and help the coordinators proceed with their project work.

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A plea for conservation of threatened tree fern (*Cyathea gigantea*)

Cyathea gigantea (Wall. Ex Hook.) belonging to the family Cyatheaceae, is a giant tree fern. It is widely distributed in hill regions of eastern and peninsular India¹. In the north-eastern region, it grows in all the states up to 1200 m altitude^{2,3}. It grows abundantly near streams, river banks and also on mountain slopes. Traditionally, the species is exploited for starch by the local people. The trunk is used for growing epiphytic orchids.

During the recent years, the population of *C. gigantea* (Figure 1) is depleting at an alarming rate. Presently the species is nowhere abundant or frequent as reported by Jamir and Rao² and Baishya and Rao³ and is treated as one of the endangered plants of India⁴. Causes of decrease in population of the species are directly or indirectly related to sudden and often far-reaching disturbances in forest ecosystems. Expanding urbanization, construc-

tion activities such as hydroelectric dams, buildings and roads, encroachment on vast areas of forest lands for extension of arable expenses and mining operations are examples of direct slaughtering of the species. In Arunachal Pradesh alone, prior to the Supreme Court ban on felling, there were 17 plywood mills, 14 veneer units and nearly 40 sawmills of various sizes and capacities. These industries consumed over 9.8 million cubic



Figure 1. *Cyathea gigantea* population.

feet of timber, annually. However, the gap between demand and supply was met by illegal cutting, which is continuing even today. These illegal logging operations are intensively confined to more inaccessible areas along the rivers, thus destroying and fragmenting the habitat of *Cyathea* sp. which grows in moist places. The traditional practice of slash and burn agriculture or 'jhuming' is widespread in the region. The bulk of jhuming takes place along the roads and nearby areas, as they are the most accessible. Along with other vegetation, *Cyathea* is also burnt and destroyed.

Due to large-scale deforestation, drying of streams and small rivers in winter and over-flooding during rainy season have become common phenomena which adversely affect the regeneration

of *Cyathea* sp., as it prefers to grow in such habitats. Probability of dispersal of spores of *Cyathea* sp. in adverse/dry habitats has increased many folds due to large-scale logging operations in tropical and subtropical forests of the region. A preliminary regeneration survey of *Cyathea* sp. in and around the Itanagar Wildlife Sanctuary reveals the total absence of young population, i.e. seedlings and saplings. This indicates the failure of regeneration. As a matter of fact, the spores in *C. gigantea* become fertile in February, when the rains are very scanty and the forest floor is dry due to the absence of humus and overhead canopy. Such conditions may have hindered the germination of spores in exposed/deforested areas. Apart from these, deforested areas are quickly invaded by many notorious weeds, e.g. *Mikania macrantha*, *Eupatorium odoratum*, etc. Vigorous growth of these weeds not only hinders the regeneration, but also affects the reproductive efficiency and sometimes causes death of adult plants also, by covering and folding them all-around.

Though the Supreme Court ban on felling is expected to improve the habitat conditions for this species, increasing population pressure coupled with other irrational developmental activities seem to nullify the gradually improving situation. Therefore, it is necessary

not only to ensure proper *in situ* conservation by declaring specific habitats of the species as protected areas (in the same line as the Orchid Sanctuary in Sessa, Arunachal Pradesh), but also *ex situ* conservation by establishing arboreta and gene banks in suitable locations. Modern tissue culture techniques may be developed to overcome the regeneration problem of the species.

1. Jain, S. K. and Sastry, A. R. K., in *Threatened Plants of India – A State of the Art Report*, Botanical Survey of India, Howrah, 1980.
2. Jamir, N. S. and Rao, R. R., in *The Ferns of Nagaland*, Vedams Books, New Delhi, 1988, p. 426.
3. Baishya, A. K. and Rao, R. R., in *Ferns and Fern-Allies of Meghalaya State, India*, Scientific Publishers, Jodhpur, 1982.
4. Beniwal, B. S., in *Souvenir of Orchid Society of Arunachal, Itanagar*, 1994, pp. 30–31.

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The integrity of structures, individuals and institutions: The Sunder–Parida episode

I have read with keen interest and deep concern as a scientist, the editorial¹ and the scientific correspondence² concerning 'reproducibility of metal fatigue'. *Current Science* deserves kudos for providing a forum for scientific debate on controversial issues of scientific fraud. However, I wonder why the Director, NAL imputes motives to the Editor, *Current Science* for publication of Sunder's paper. Perhaps, he considers NAL, its Director and scientists and DG-CSIR as sacred cows of the Indian scientific establishment, while mentioning a letter written to the Editor to stop publication of Sunder's paper².

It is obvious that the second expert committee had indicted Parida, even though rather mildly. I wonder why the committee failed to establish the owner-

ship of the fractographs, a core issue in the whole episode. Even if there is an element of personal bias and prejudice as claimed by the Director, NAL and Parida in their responses, Sunder deserves the appreciation of readers of *Current Science* for 'letting the cat out of the bag'.

Finally, a word about the questionable means used by Sunder to expose the scientific fraud of a former colleague. I am reminded of the recent exposure of corruption in the high echelons of Indian society and the Ministry of Defence by *tehelka.com*. The Indian Government has taken legal action against Tejpal, the Director of *tehelka.com*, for using questionable means to expose corruption, while accommodating the accused persons even before the enquiry commission

had submitted its report. There is rampant corruption in the political and bureaucratic set-up in India and our scientific establishments are no more islands of honesty. It is only the 'freelancers' like Sunder and Tejpal who risk their lives to expose frauds and corruption.

1. Balaram, P., *Curr. Sci.*, 2001, **81**, 1389–1390.
2. Sunder, R., Parida, B. K. and Prahlad, T. S., *ibid*, 1402–1410.

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