

## Research fellowships in India

While I share several sentiments voiced by Balamram in his editorial<sup>1</sup>, 'Luring the overseas Indian scientist'. I am dismayed with the derision with which he comments on the new schemes launched by DBT and DST. To use the term 'lure' is to suggest that these schemes make false promises with an intention to trap unsuspecting scientists! I am sure the scientific fraternity that includes policy-makers, funding agencies, directors of institutes and scientific leaders does not intend to fool young scientists.

Balamram has suggested that we develop mechanisms to retain and absorb the PhDs in our own institutions. Outreach visits of the India Alliance to institutes across India, we found that most mentors and supervisors strongly advise their graduate students against continuing their training in India after completing their PhD. The Indian Institute of Science, Bangalore is no exception to this senti-

ment. In the last two years, the India Alliance has offered 80 Early Career Fellowships (ECFs) to fresh PhDs to do a postdoc in India. In spite of these fellowships offering financial benefits at par with international standards, we have struggled to find enough numbers of postdocs who are committed or advised to stay in India. Sadly, after two years and four rounds of competition (one of which was cancelled due to poor response), we have been able to award only 13 ECFs.

To further quote Balamram: 'A growing number of women with PhD degrees are sometimes unable to spend extended postdoctoral periods overseas'. In spite of several fellowships and schemes by DST, DBT and UGC, women scientists who are unable to go abroad for research find themselves at a disadvantage when looking for jobs in India.

I wish we did not have to go abroad, and that we had a robust scientific infra-

structure where the rest of the world wants to come. But we are not there yet and in order to build this utopia we need to begin somewhere. We have and will make mistakes but is it not better that we, as a community, explore all mechanisms as possible solutions rather than problems?

Balamram's editorial also alludes to the provisions of the Margdarshi Fellowship. Readers are directed to the India Alliance's website [www.wellcomedbt.org](http://www.wellcomedbt.org) to learn more about the scheme, and our other policies.

1. Balamram, P., *Curr. Sci.*, 2011, **100**, 957–958.

ANURADHA LOHIA

*The Wellcome Trust/DBT India Alliance,  
Hyderabad 500 034, India  
e-mail: anuradha.lohia@wellcomedbt.org*

## Human-directed evolution of domesticated plants and animals

Dharmapalan<sup>1</sup> reflects the extreme views advocated by the opponents of GM crops, based on heresy and not scientific facts. His denigration of Padmanaban's<sup>2</sup> views regarding the industrial and the green revolutions is prejudiced and entirely wrong, as are his other assertions. It is a fact that India under the British rule missed the industrial revolution, and though late to start the present India is a product of industrialization. In a competitive world, a large country of billion-plus population cannot survive without contemporary industries and progressive farming. Saying that green revolution has caused 'havoc', and resulted 'in many wild relatives becoming extinct' is gross exaggeration. Yes, due to excessive use of nitrogen fertilizers, water bodies in some intensive cropping areas have shown high nitrate levels and few people have suffered from toxic effects of the pesticides. Not introducing the semi-dwarf, nitrogen-responsive, high-yielding rice and wheat cultivars in the mid-sixties would have led to a human tra-

gedy of much larger dimensions due to starvation. The country was importing 10 million tonnes of wheat each year from USA under PL480. The new cultivars made India self-sufficient in cereals and also an exporter of rice, currently supporting a population of 1.2 billion. The overall benefits of the new technology have been far greater than the adverse impacts. It has also saved further destruction of natural forests by increasing productivity of the land already under cultivation. Otherwise, forest land would have been ploughed to satisfy the hunger of the growing population.

New technologies are introduced and adopted only when the benefits outweigh the risks. Even growing of plants or agriculture, that started 10,000 years ago, was possible only after clearing the natural vegetation on the land. Destruction of natural habitat must have caused extinction of many species. The society was not developed to recognize the loss at that time. On the positive side, cultivation of crops led to human settlements and ad-

vancement of civilization as we know today. It led to the development of science and new technologies in different areas. It also increased the capabilities to monitor subtle changes in the environment, including the loss of species. Can we say that cultivation of crops was a great disaster as it led to the loss of biodiversity? Even food-gathering and hunting practised by pre-agricultural humans must have caused environmental perturbations about which we have no knowledge.

Most of the statements made by Dharmapalan reflect his own perceptions that are not shared by the silent majority of professional biologists. I would restrict my comment to two statements made by him. (i) Referring to the book *Silent Spring*<sup>3</sup> by Rachel Carson he says 'Unfortunately, it seems that none of our scientists has read this book'. Biologists are much more concerned about the environment following her publications in the early sixties. The biggest success of genetic engineering (GE) in crop plants has been the creation of insect-resistant cul-

tivars that reduce the pesticide use on crops, and their load in the environment – precisely what Carson advocated. Her writings show that she was not for total ban on pesticides, but for their judicious and limited use. She strongly opposed the aerial spraying of DDT in Long Island, New York. It is unfortunate that aerial spraying of endosulfan was practised in Kasargod, Kerala even after 50 years of her widely read publications. (ii) Long-term effects of GE crops are studied using animal model systems with shorter lifespan. Feeding experiments with GE crops on humans with a lifespan of 75 years cannot be done. The results of such experiments can show any of the three possibilities: (a) no effect, (b) in-

creased lifespan or (c) higher morbidity and reduced lifespan. If the experiments show the first two, the opponents will demand data on the effects in the progeny of such people. Their aim is to delay the approvals.

Two statements mentioning that GE crops are not the only solution, and like all other technologies GE has advantages and drawbacks are correct. However, currently GE happens to be the most powerful tool available to move the desired genes into crop plants from the same and alien species, or even synthesized genes. Lastly, human-directed evolution using contemporary knowledge and tools has been practised since the domestication of plants and animals. It

remains the best way to feed the growing world population.

1. Dharmapalan, B., *Curr. Sci.*, 2011, **100**, 1119.
2. Padmanaban, G., *Curr. Sci.*, 2011, **100**, 157–158.
3. Carson, R., *Silent Spring*, Houghton and Mifflin, Boston, 1962.

C. R. BHATIA

17 Rohini, Plot 29-30,  
Sector 9-A, Vashi,  
New Mumbai 400 703, India  
e-mail: chitranjan.bhatia@yahoo.com

## Registration of geologists

With increasing developmental activities, the demand for expertise is also increasing that ensures safety of investment and also to comply with the mandatory existing rules and regulations. To fulfil the above objectives, the field of consultancy is proliferating and getting complex day by day because of emerging technologies and issues. The expertise can be sourced from various sectors like the government, large to small private companies, NGO and individuals. The demand for geological studies and certifications for any kind of activity which is concerned with the earth, be it is in construction of buildings, roads, railway lines, power transmission lines besides conventional roles of geologists in the fields of exploration, prospecting and development of mineral, petroleum and coal deposits in mining, dams and tunnels, etc., is logically also on the increase. Geology is as specialized as medicine or any other field. At the same time, there exists phenomenal ignorance about geological processes/actions in society; this is because of the lack of incorporation of geological topics in the school curriculum and limited requirement of the geologists in the formal set-up.

Usually one becomes a qualified geologist by obtaining a postgraduate degree in pure or classical geology, and if one devotes an additional year, he/she can obtain a degree in applied geology or can do a specialization in any branch of his/her choice. After field experience, one can handle tasks independently.

Till a decade or two ago almost all trained geologists were employed in government jobs. With a change in economic policies, now sizable numbers find opportunities in the private sector. Many a times, one cannot approach government agencies or private organizations for small geological jobs to be done. In this situation one has to rely on geological advice of individual or small firms. Their reports are used to substantiate claims. Though such reports are legally acceptable, their legal accountability may be questionable. Secondly, geological studies rarely require a second opinion because no adverse effects on geological parameters will be visible during the construction stage. At times geologists are hired for fulfilling the mandatory requirements when work is in advanced stage of completion or in the case of nearly complete cases of manned

reports. If something goes wrong at a later stage, the blame may be put on many non-geological factors as geological studies are not taken seriously/attempted at all. Yet a sound geological study would reveal the pros and cons of a terrain with remedial measures. To fulfil the objectives of safety and durability of a structure we need a system of legal accountability of those who provide geological inputs or give certificates. One step in this direction is to make the registration of geologists mandatory with some competent authorities, for example, with the Geological Survey of India or State Departments of Geology. The registration may be made compulsory for jobs in the government or private sector, or for consultancy work. The registration may be similar as that of chartered accountants, doctors or lawyers. This approach would not only inculcate accountability in practising geologists, but also a demand for accurate geological studies.

A. K. BIYANI

Department of Geology,  
DBS College,  
Dehradun 248 001, India  
e-mail: biyani\_ajay@yahoo.com