

of Ph Ds produced is bound to increase substantially. These laboratories are no doubt well equipped to carry out good research, but most of the mentors in the national laboratories will only use the students to do their work and publish papers so that their progress is not hindered.

The desire to increase the number will only lead to producing more Ph Ds who are mostly incompetent. To assume that India can produce a few Nobel laureates

by increasing the number of Ph Ds produced in these 'production mills' is a false dream. That can only happen, if the controlling agencies first improve the quality of mentors and then develop uniform guidelines for the internship. Just giving a few crores of rupees to some institutions, recognizing all scientists as mentors and allowing them to produce Ph Ds will only lead to further deterioration of the existing system.

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## Good GM crops would flourish in India

The right kind of GM technology would flourish in India, in contrast to the concerns expressed in a recent article in *Current Science*<sup>1</sup>. India has already welcomed GM products in medicine and we have a large number of GM drugs (such as urokinase, erythropoietin and vaccines) currently available. The success of medical biotechnology is due to the fact that it is containable. In agriculture, GM crops relevant to our country like those with drought-, salt-resistant and nutritional quality genes shall be welcomed. The inappropriate GM crops include unrecalable and uncontrollable ones like those with *Bt* and herbicide genes. The inappropriateness of this category of GM crops under Indian farming conditions and the irrelevance of buffer zones between them and non-GM crops have been discussed earlier<sup>2–4</sup>. In this context, the Golden rice is likely to be welcomed, whereas *Bt* rice would be rejected by the public. *Bt* rice could be dumped like pesticides and herbicides banned in the countries of their origin. Unfortunately, the end-users of GM technology were apparently frightened by *Bt* brinjal which went first for approval instead of a beneficial GM crop like the Golden rice. Now we have to work harder to convince the end-users. It is well known that in a market-driven economy, any product unwanted by the consumers would go off the shelves towards burial like the flavour saver tomato<sup>5</sup>.

The labelling of GM crops is already debated by the public as reflected in an editorial cited elsewhere<sup>2</sup>. However, implementation of GM labelling would be impracticable under Indian marketing conditions, unless new genes for colour or pattern are introduced into the appropriate GM crops. The Golden rice is a unique example of built-in GM labelling and thus it can be easily distinguished from non-GM crops.

A shift in mindset of both the activists and enthusiastic scientists of GM technology is the need of the hour for successful introduction of GM crops in India. It makes no difference for the activists whether 'cry' or 'smile' genes are incorporated in the GM crops. As a matter of fact, the *Cry* gene has made the activists cry more. Their concern appears to be safety and environmental aspects, in addition to seed security. To address the latter, one way is to develop our own GM seeds in the public sector and leave them in the public domain (without patenting), like what our ancestors did for traditional medicine. This way, the farmers would be benefited and relieved from the trap of multinational companies who will charge exorbitantly after making the farmers dependent on them. Also, it is necessary to put forth the benefits and risks of GM crops in a simple manner. GM crop activists and enthusiasts seem to highlight the aspects that suit them; the former concentrating on the draw-

backs and the latter on the benefits. For example, the enthusiastic scientists often quote countries like USA which have permitted GM crops liberally and conveniently forget countries like Europe, Ireland and Japan which restrict GM crops. History tells that the US used pesticides and herbicides indiscriminately and decades later realized that the residues of these went through water and food, and caused several genetic disorders, including cancer. Recent history shows that India is better off in its economy by not following the US. In conclusion, scientists have greater responsibilities and it is not surprising that they take well-documented environmental impacts of GM crops of the *Bt* category seriously<sup>4–6</sup>.

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