Fate of agricultural postgraduates in India

Agricultural education plays an important role in the overall development of our country. The country has thirty-four State agricultural universities and four deemed universities, all coming under the Indian Council of Agricultural Research (ICAR). After receiving their Bachelor's degree in agriculture, students prefer to go for a Master's degree, as there are no suitable job opportunities. The Junior Research Fellowship from ICAR is one of the reasons that students go for the Master's degree. Students joining the Master's degree course in State agricultural universities, even without any financial aid, are interested solely in improving their qualifications.

Today, the ICAR offers temporary posts of Research Associates and Senior Research Fellows to various agricultural institutes and state agricultural universities under different projects. These temporary jobs fulfil the needs of only one-tenth of the post-graduates. The remaining are still unemployed.

Most of the postgraduates now entirely depend on Agricultural Research Service exams conducted by the Agricultural Scientist Recruitment Board, which did not recruit scientists for the past two years. As a result, there is an increasing trend among agricultural graduates to enter non-agricultural areas like civil services, banking, railways, etc. If this is the situation, then how can we get good agricultural scientists and how can the next Green Revolution be achieved? Our government should provide proper job opportunities for agricultural postgraduates in order to achieve a long-term goal of the next Green Revolution in India before 2015.

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Indian scholars boost S&T research in Taiwan

Over the last few decades Taiwan has transformed itself from a country with agricultural backwater status to a global technological giant[1,2]. During the late 1970s, the government of Taiwan initiated an intensive science and technology development programme in order to shift the focus of industrial development from heavy, capital-intensive industries to non-energy, non-polluting and science-based industries. In order to provide the infrastructure for this development, the government instituted and funded research and development institutes strategic parts of Taiwan and also provided a number of incentives for the development of science-based industries[1].

The high-tech Hsinchu Science-based Industrial Park, located about 70 km from the capital city, Taipei, is home to 284 companies, mostly international, and all involved in high-tech research and development[1]. Initially, the primary industries to be promoted consisted of machinery, electronics and chemicals. Later, fields such as telecommunications, electronics, software, aerospace, pharmaceuticals, health care, pollution prevention, biotechnology, resource development and energy conservation were included[3].

Over the last few years, young Indian scientists have been involved in various research projects and are contributing towards the development of science and engineering in Taiwan. Between 2000 and 2003, a total of 698 postdoctoral scholars from India were recruited to work in various science-based research projects sponsored by the National Science Council of Taiwan, one of the major funding agencies supporting science-based research projects[4] (Figure 1). The highest number of Indian post-doctoral fellows was recorded in 2000, with 248 individuals. They were placed in various research laboratories throughout Taiwan. Although 50% reduction in recruitment was seen in 2001, an increase of 25% during 2001–02 and 10% during 2002–03 was recorded (Figure 1).

Majority of the Indian scholars were recruited in the field of natural sciences, followed by life sciences. These two categories combined, exceeded 80% of the total Indian postdoctoral research fellows each year. Engineering and applied sciences was the third largest field for recruitment of Indian postdoctoral res-

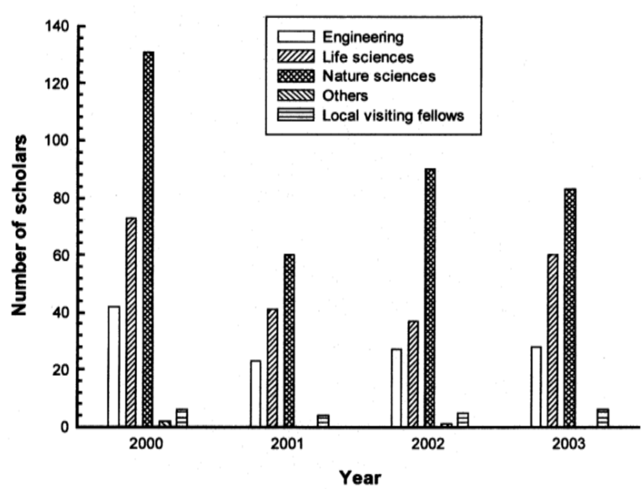

Figure 1. Indian postdoctoral scholars in the field of science and engineering in Taiwan during 2000–03.

earch fellows, the relative percentage being nearly 17% each year.

Visiting scientists are non-Indians and this category includes visiting research fellows, visiting professors, visiting assistants/associate research fellows, and visiting experts (Figure 1). The average number of local visiting fellows was 5.25% (range 4–6) during these four years; since most locals with doctoral degrees prefer to get a job either in universities or research institutes after graduation, they seldom prefer postdoctoral fellowships. Thus there is a need for Taiwan to recruit postdoctoral scholars from overseas.

Despite the fact that Indian scholars initially have difficulties with regard to food, living conditions, etc. in Taiwan, the low cost of living, reasonable salary (USD 1700/month) and excellent opportunities to work in well-equipped research laboratories are major attractions.

Most Indian scholars usually stay for a period of one to three years to gain postdoctoral experience, before returning to India or set out elsewhere in the West to further their research, technological and academic goals. Although there is no diplomatic relation between Taiwan and India (India recognizes the People's Republic of China), visa processing work is being handled without much hastle by the Taiwan Business and Culture Office in New Delhi. Fluency in English writing, professionalism, dedication and hard working attitude of Indian scholars are well-appreciated by scientists in Taiwan.

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Recognition of merit

The editorial 'The Shanghai Rankings'[1] puts all our scientific efforts in proper perspective. A few points would suffice to illustrate the reason for our disappointing ratings and the lack of any university making it to the list. Since the last 10–15 years universities have practically stopped hiring, leading to a vacuum at the base-level for research in universities. Senior scientists being assigned additional academic and administrative responsibilities, have little time for research. In spite of noble efforts to recognize merit at the national level through the ritualistic NET–Lecturership–GATE, etc. there is no follow-up to give appropriate opportunities to the ones who excel. The editorial noted the casual approach towards research in most universities due to many reasons. I think the time has come to start a cadre of research scientists in universities, institutes and leading laboratories to mobilize talented young scientists to energize the research tempo and thus to encourage creative research. Otherwise, we will continue to be where we are, no matter what efforts we make by offering more and more scholarships without any scope for job security.

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Managing water

Gupta and Deshpande[1] have exercised due caution in their first-order assessment of India's water future. Their assessments are based on nationwide hydrological estimates covering 3.1 million km^2. It is instructive to compare these estimates with those for California, which, in size, diversity of landscape, climate, geology and vegetation, is comparable to India.

India is about 7.6 times the size of California. Compared to India's annual precipitation of 4000 km^3, California[2] receives 247 km^3. India's evaporation amounts to 1789 km^3 or 44.7%, and groundwater recharge, 342 km^3 or 8.6% of total rainfall. For California, evapotranspiration has been estimated at 65% of total precipitation, and groundwater recharge, 18%. The almost 20% difference between India and California in evaporation loss is intriguing. Does India's evaporation estimate include transpiration? Also intriguing is that groundwater recharge for California is twice that for India. Errors in these estimates can seriously affect water availability assessments.

Gupta and Deshpande[1] conclude that management of groundwater storage space through rain harvesting and artificial recharge can generate 125 km^3 annually, duly recognizing that groundwater recharge on this scale has not been resorted to anywhere in the world. Here, two thoughts are relevant. First, except near the water table, where the water-bearing formation drains water by desaturation,