

## Success Story of Ramalingaswami Re-entry Fellowship Scheme

The Ramalingaswami Re-entry Fellowship was envisaged in year 2006 with an aim to encouraging scientists working across world to return to India and peruse their research interests in home country. The major objective of the scheme was to improve India's human resource capacity in terms of development, translation and diffusion by means of attracting Indian scientists settled abroad in field of life science and biotechnology.

The data suggest that the number of Ramalingaswami Re-entry Fellowships have increased from 50 to 75 fellowships per year from year 2017 onwards. Up to now, about 322 fellows have returned and joined research in various Indian laboratories. Out of all, 223 fellows have acquired permanent faculty positions.

It has been observed that more and more Indian origin scientists want to return and join different reputed research institutes and R&D laboratories which facilitates young scientist with excellent research facilities and atmosphere to carry out high quality research. Ramalingaswami Re-entry fellows have published their research work in high impact peer reviewed national and international journals. According to DBT's 2017-18 annual report, the Ramalingaswami Re-entry Fellows scientists have published about 155 publications with impact factor <5, 125 publications with impact > 5, and 30 spin off companies have been developed.

To popularize biotechnology activities in India, the DBT also provides financial assistance for organizing conferences, symposium, seminars, workshops, conducting training programmes and provides travel support to the students and researchers working in field of biotechnology.

Some of the major strides made by Ramalingaswami Re-entry fellows include development of new technologies, patents filing and establishment of multiple companies. Some of the important products and technologies developed under the scheme are discussed in detail and represented by figure 1.

- ✓ **Hydrogel Based Drug Delivery:** Hydrogel based drug delivery was developed to prevent organ rejection. Animal model trials have been conducted in both small animal models like rats and large animal models such as pigs. Furthermore, clinical trials are

under way and it is believed that such technological interventions will help in protection of transplanted organs without any side effects.

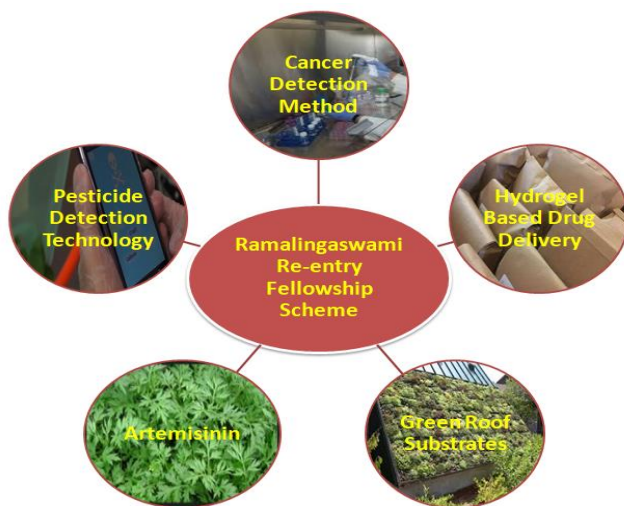


Figure 1: Some of the successful technologies developed by Ramalingaswami Re-entry Fellows

- ✓ **Green Roof Substrates:** Green roof substrates were developed using local materials such as vermiculite, sand, crushed brick, perlite, coco-peat, seaweeds, etc. available locally. The advantage of the green roof technology is that it can be installed on existing rooftops without structural modifications. A light weight green roof system was developed and successfully operated under pilot and real conditions. Under the scheme, green roof systems were developed for light weight drainage boards and local plant species.
- ✓ **Biodegradable Packaging Boxes:** Food and non-food biodegradable packing boxes have been developed from low cost, and easily available agricultural waste. Additionally, partition boards and false ceilings have been developed from rice straw and sugarcane bagasse which is otherwise often burnt resulting in air pollution. Also disposable like low cost cups and containers were developed for food packing purposes, biodegradable diapers and sorbent materials have been developed from agricultural wastes.
- ✓ **Cancer Detection Method:** A non-invasive method for cancer detection was developed using pulse induction magnetic nanoparticles detector (PIMNP) with preclinical validation in progress.

- ✓ **Artemisinin:** the artemisinin, an antimalarial drug development was carried out using tobacco plants as bio-factories. The idea was validated and proven effective using whole plant material as compared to pure artemisinin.
- ✓ **Pesticide Detection Technology:** A pesticide detection technology was developed to detect pesticides in food using which involved mass spectrophotometry. Field tests were carried on 20 acre land and about 500-1000 samples were analyzed per day. The technology was sub-licensed for commercialization to a spinoff company, Barefeet Analytics Pvt. Ltd.

Data analysis of last five years of Ramalingaswami Re-entry Fellowship Scheme has shown that number of selections has increased and more and more researchers are applying and joining the research in Indian research institutions and laboratories (**Fig. 2**).

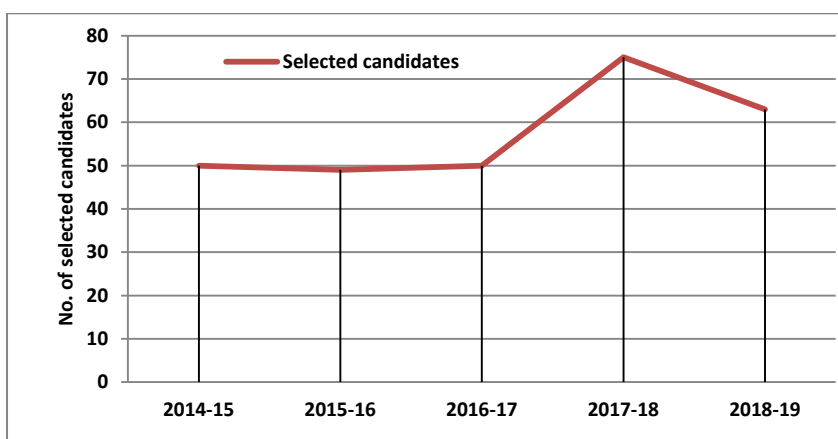


Figure 2: Trend showing increased number of Indian scientists selected for Ramalingaswami Re-entry Fellowship during last 05 years

Such fellowships have encouraged Indian scientists working in biotechnology and life sciences to work in mainstream of Indian science.

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