

EXECUTIVE SUMMARY

Preamble

- Competitiveness of an economy is largely dependent on skilled manpower. Since independence, India has been losing its knowledge resource in terms of migration of its highly qualified persons to other countries- a phenomenon known as '*Brain Drain*'. But the liberalization of economy and changing industrial, scientific, technological and social scenario in the country since early-1990s have created challenging opportunities for trained / highly skilled personnel to return to India. It is being catalyzed by employment entrepreneurship, opportunities in high-tech areas like information and communication technology, biotechnology, bio-informatics, pharmaceuticals, e-banking, etc. Consequently, several highly qualified / trained persons have started returning to the home country- a phenomenon known, as '*Reverse Brain Drain*' or being knowledge gain to India, as '*Reverse Brain Gain*' (RBG).
- The RBG that has started in a limited way needs to be 'properly' institutionalised so that it does not remain a sporadic phenomenon. Empirical based policy formulations are required that can address the various issues that governs RBG. This study was commissioned by DST, Govt. of India to NRIF (Natural Resource Foundation) with the broad objective to capture in details various aspects of RBG through primary investigation of selected sample of persons who have returned to India and suggest policy recommendations.

- The **specific objectives** of this study were:

To identify major technological areas where reverse brain drain leading to brain gain appears to have occurred:

- Biotechnology
- Drugs & Pharmaceuticals
- Agriculture
- Information and Communication Technology (ICT)
- To find the extent to which Reverse Brain Gain (RBG) has spread across India, besides its impact on each of the identified areas.
- To underscore the factors that governs the RBG in various areas.
- To suggest related policy interventions and provide suggestions and recommendations based on above findings.
- The Study was: with a 16 year reference period from 1990-91 to 2006-07.

Key Findings of the Study

- The study has revealed that the process of 'Reverse Brain Drain' (RBD) / 'Reverse Brain Gain' (RBG) had although started during early-1990s, but got momentum only in the last few years. The maximum number of cases occurred during 2005-08.
- Across the four technological areas selected for the study, maximum number of RBD / RBG persons returned in ICT sector; followed by biotechnology, pharmaceutical and lastly agriculture areas. The growth rate of returnee has also been much faster in ICT than other technological areas.
- The number of countries from which RBD / RBG persons have returned is as large as 60. The maximum number of persons, as one would expect, have returned from USA, followed by UK, Singapore, Australia, Germany, UAE, Japan, and Canada.
- The analysis in terms of duration of stay has revealed that a majority (42.1%) of professionals returning to India had gone (received) on long-term (more than 2 years) assignments. The proportion of RBD / RBG persons who had gone on permanent assignment has also been found quite significant. The study has revealed that about one-fourth of RBD / RBG persons had permanent visa status and citizenship of that country. *This shows their strong urge to return to India.*
- The age-group-wise analysis of RBD / RBG persons has indicated that age group of 31-40 years is biggest, followed by 41-50 years group and up to 30 years group. It also shows that maximum returnees are in their youth with maximum capacity to work.
- The Reverse Brain Drain scenario has been found to enjoy male dominance.
- Qualifications and area of specialization of RBD / RBG persons being an important parameter, both pre-migration and post-migration status has been investigated. A significant proportion of RBD / RBG persons have acquired higher qualifications in terms of post-graduate and PhD degrees or more research experience in their specialized areas. The post-migration scenario has revealed that the percentage of graduates has gone down and of post-graduates has increased. *Thus, RBD / RBG persons are more qualified and have more experience in their specialized fields, which depicts high knowledge-gain to the country.*
- 'Scenario after home-coming' of returnees is an important segment of the study through which, it has concluded that the returnees share higher positions of responsibility in India than they had in foreign countries. Some of them have even launched or planning to

launch their own enterprises. It is believed that a significant number of these RBD / RBG persons have established small and medium-scale enterprises.

- A notable feature emerged from the study is the high level of satisfaction expressed by the returnees after coming back to India. Such a high level of satisfaction will provide strength to the RBD / RBG persons to work with more vigor which ultimately will be gain to India.
- The study has observed a decline in the proportion of RBD / RBG persons associated with R&D sector in India than that was in foreign countries. It is the consequence of lower investment to R&D sector by India than in several foreign countries.
- The spread of RBD / RBG persons in India was in 14 states / union territories of the country. The biggest congregation of RBD persons has been reported in Andhra Pradesh.
- The study revealed major achievements of RBD / RBG persons in the following areas: -
 - Development of *novel projects, novel process, or new designs*
 - *Exploring new clients* for their companies
 - Creation of new brands for their clients
 - *Introduction of organizational changes* for better performance
 - Imparting *tacit knowledge* to fellow colleagues
 - Evolution of *quality assurance mechanism*
 - Development of *just-in-time delivery system*
 - Introduction of *innovative accounting system* in the organization
 - Evolution of *management information system (MIS)*
- The study has outlined some 'Success Stories of RBD / RBG Persons'. These covered the areas of communication technologies (M/s Sanskean Ltd.), production of Hepatitis B vaccine in India (M/s Shanta Biotech), innovative combination of genetics and grain technologies (M/s Avesthagen), synthesis of vaccine for dysentery, pediatric, cardiology, tele-radiology, etc.

Key Policy Suggestions / Recommendations

- India needs to understand the pattern of RBG thoroughly and various waves of RBD / RBG from time to time.
- The sector-specific infrastructural requirements need to be identified and created so that RBD / RBG professionals feel comfortable back home.

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- There is a need for developing common infrastructural facilities under public-private partnership (PPP), which will provide prompt and quality services.
 - The study suggests 'Replication of Tamil Nadu Model' in other states. In this Model, Tamil Nadu has developed infrastructure facilities at the district level and has not restricted itself to capital or one / two cities. It has provided more choices / locations to RBB/ RBG persons.
 - On the basis of feedback received from the respondents, the study has concluded that a number of changes will have to be made in policies related to sectors of education, research and industry to attract more professional people from abroad to India. Among the key issues that emerged were: Universities should have curriculum that evolves and involve experts in the designing process. Herein the persons who have returned and are involved in cutting edge research, can play a significant role. Separate funds can be earmarked for RBG persons who are interested to undertake research after coming back. Industry needs to be motivated to provide incentives to RBG, create own facilitation channels and not dependent solely on government intervention.
 - It was felt that many issues that were raised require more in depth investigation. The scope needs to be widened so that more technological areas can be covered. The study needs to cover issues of entrepreneurship, effect on different industry segments and research more intensively. This primary survey can provide the background to undertake a further case based study. This can help in articulating specific policy inputs that can catalyze the RBG process.