GOVERNMENT OF INDIA
MINISTRY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF SCIENCE AND TECHNOLOGY
LOK SABHA
UNSTARRED QUESTION NO. 3140
ANSWERED ON 19/03/2025

RESEARCH AND INNOVATION IN S&T

3140. SHRI JASHUBHAI BHILUBHAI RATHVA:

Will the Minister of SCIENCE AND TECHNOLOGY be pleased to state:

(a) whether the Government has taken steps to collaborate with academic institutions to foster research and innovation in science and technology; and

(b) If so, the impact of research and development measures in increasing exposure of students in academic institutions?

ANSWER
MINISTER OF STATE (INDEPENDENT CHARGE) OF THE MINISTRY OF SCIENCE AND TECHNOLOGY AND EARTH SCIENCES
(DR. JITENDRA SINGH)

विज्ञान और प्रौद्योगिकी तथा पृथ्वी विज्ञान मंत्रालय के राज्य मंत्री (स्वतंत्र प्रभार)
(डॉ. जितेंद्र सिंह)

(a) to (b): Yes. The Research and Development (R&D) measures increased the exposure of the students in academic institutions to real-world problems and created opportunities for working on the state-of-the-art R&D infrastructure created in the Country. These measures cultivated critical thinking and innovation skills, bridged the gap between theoretical knowledge and practical applications and helped in building a very strong academia-industry ecosystem wherein research lead to technology transfer. R&D in academic institutions thus increased the exposure of students beyond the confines of traditional education and propelled them to the forefront of global competitiveness, positioning them for cutting-edge research, interdisciplinary collaboration, intellectual contributions and preparing them for the demands of a knowledge-driven society.

The impact of R&D measures taken by the Government in increasing exposure of students in academic institutions is given below:

The total Ph.D. enrolment in India has increased to 81.2% in 2021-2022 (2.13 lakh) from 2015-2016 (1.17 lakh). In 2021-22, female enrollment in PhD programs in India doubled to 99,000 (0.99 lakh) from 48,000 (0.48 lakh) in 2014-15, representing a significant increase in women's participation in higher education, especially at the PhD level. In the year 2021-22, Gross Enrolment Ratio (GER) in higher education for the age group 18-23 years is estimated as 28.4, as compared to 23.7 in 2014-15. Female GER has increased to 28.5 in 2021-22 from 22.9 in 2014-15. Of the total enrolment in 2021-22, the number of Student enrolment in STEM for UG, PG, Ph.D. and M.Phil. levels is 98,49,488 (25.6%).

The details of various measures taken by the Government to collaborate with academic institutions to foster research and innovation in science and technology, thereby increasing exposure of students in academic institutions to Research and Development is given in Annexure – I.

ANNEXURE – I

1. Department of Biotechnology (DBT)

(a) Fellowship Programmes: DBT has taken significant steps to collaborate with academic institutions to foster research and innovation in science and technology. The Department has established several fellowship programs and initiatives that enhance collaboration between researchers and academic institutions. The DBT - Junior Research Fellowship Programme, DBT-RA Program in Biotechnology and Life Sciences, Ramalingaswami Re-entry Fellowship, Biotechnology Career Advancement and Re-orientation (BioCARe) Fellowship, and M K Bhan Fellowship programs represent significant initiatives by the Department to foster collaboration with academic institutions. These programs enhance exposure to research environments by creating pathways for researchers to engage with academic institutions, establish research groups, mentor students, and contribute to India's scientific advancement.

(b) R&D Infrastructure: DBT has been supporting the development of research infrastructure at universities and research institutes across the country under Research Resource, Service Facility and Platform (abbreviated as RRSFP) Programme through the following components

- **DBT- Boost to University Interdisciplinary Life Science Departments for Education and Research Programme (DBT-BUILDER) which focuses on upgrading the post-graduate teaching and training laboratories by enabling interdisciplinary advanced research and teaching capacity emphasizing discovery and innovation in proposed research areas, addressing emerging technologies with inter-disciplinary cross talk. In the DBT-BUILDER programme a total of 45 Universities and Institutes were supported, comprising 9 Central University, 14 State University, and 22 Private Universities or Postgraduate Colleges. Across these institutions, 177 departments received support, with 34 in central universities, 56 in state universities, and 87 in private institutions.**

- **DBT - Scientific Infrastructure Access for Harnessing Academia University Research Joint Collaboration (DBT-SAHAJ) aims at creating "national" service facility/research resource/platform to provide access to resources that could not be provided by any single researcher's laboratory or scientific department. The Unified Online Booking Portal under the DBT-SAHAJ lists available equipment, user charges, and availability, allowing users to book facilities in advance.**

(c) Star College Programme: The Star College Programme was initiated by DBT in 2008 to support colleges and universities offering undergraduate education to improve science teaching across the country. This Programme was launched for improving critical thinking and encouraging 'hands on' experimental science at undergraduate level in basic science subjects. On a larger perspective, the programme was initiated envisioning that it shall encourage more students to take up higher education in science. Through this programme the Department identifies colleges with potential for excellence and provides support for developing infrastructure for academics and laboratory activities. This support is in turn expected to invigorate teaching and provide unique exposure of students to experimental science.

(d) DBT-BIRAC Amrit Team Grant: is a new program of Department of Biotechnology (DBT) to support new and innovative collaborative research programs involving academia, the clinic and start-ups.

2. Department of Scientific & Industrial Research (DSIR)

(a) Doctoral and Postdoctoral fellowships: The Council of Scientific and Industrial Research (CSIR) under the Department of Scientific & Industrial Research (DSIR), Ministry of Science and Technology through its "Capacity Building and Human Resource Development Scheme" carried out by National S&T Human Resource Development Group (HRDG) has been providing doctoral and postdoctoral fellowships to young budding researchers through its various fellowship programmes. These young researchers are basically involved in science and technology development. The main objective of the programme is to nurture the budding scientific talent and to

nourish the objective of pursuit of scientific research. The CSIR supported research fellows are working in more than 650 academic and R&D institutions. Apart from doctoral and postdoctoral fellowships, CSIR provides financial assistance to academic and R&D institution to carry out basic and applied research in the frontier and emerging areas of science and technology. These research projects of CSIR awarded to academic and R&D institutions are also a source of S&T human resource development as the principal investigators of these research projects are a guiding force and train young researchers in recent trends of science and technology research. These researchers contribute in the scientific publications, patents, technology, processes and overall development of S&T in the country. It is an established fact that the number of research articles published from an academic institute are proportional to the number of research scholars. This is the pool of young researchers being utilised by universities and R&D institutions for their research and development work/activities and is a precious S&T asset of the country. The research activities such as doctoral and postdoctoral fellowships and research grants are contributing in the scientific development of the country as India has attained 3rd position in terms of publishing the Science and Engineering research articles, contributed in increase in researchers per million populations from India which has now reached to 260 in 2020 compared to 215 in 2015.

3. Department of Science and Technology (DST)

DST is making several efforts through its various schemes and programmes to collaborate with academic institutions to foster research and innovation in science and technology, thereby increasing exposure of students in academic institutions to Research and Development. Details of significant initiatives are given below.

(a) Innovation in Science Pursuit for Inspired Research (INSPIRE): The Scheme aims at attracting young talent toward pursuing research as a career by leveraging the existing educational structure for talent identification, without conducting any competitive exams. Covering meritorious youth from school to university levels, the scheme supports those interested in studying science and choosing scientific

research as a career. It facilitates human capacity building through scholarships, fellowships, and research exposure, enabling students to develop their skills and pursue opportunities in scientific research. The Scheme has the following components to create a robust ecosystem for cultivating future leaders in scientific research:

- **INSPIRE Internship: Provides exposure to the top 1% of students at the Class X Board level by organizing Science Camps during summer or winter. These camps allow students to interact with renowned scientists, including Nobel Laureates, fostering curiosity and inspiring them to pursue science at an early age (16-17 years).**
- **Scholarship for Higher Education (SHE): Offers 12,000 scholarships annually to meritorious students aged 17-22 years, encouraging them to study basic and natural sciences at the undergraduate level with additional scholarship and mentorship support.**
- **INSPIRE Fellowship: Awards 1,000 fellowships annually to students aged 22-27 years for pursuing Ph.D. in basic and applied sciences, including engineering, medicine, agriculture, and veterinary sciences.**
- **INSPIRE Faculty Fellowship: Provides 100 fellowships annually to young researchers aged 27-32 years with a Ph.D. qualification, offering them the opportunity to carry out research in both basic and applied science areas for a duration of 5 years, helping them establish themselves as independent researchers.**

(b) Fund for Improvement of S&T Infrastructure (FIST): The Schemes supports basic infrastructure and enabling facilities for promoting R&D activities in new and emerging areas and attracting fresh talents in universities & other educational institutions. It is considered as complimentary support for enabling Departments/ Centres/ Schools/ Colleges to pursue research activities more effectively and efficiently It was launched in 2000 under the Department of Science & Technology (DST). The duration of support for each FIST Project will be 5 years and will have 4 levels – Level-0, Level-1, Level-2, and Level-3. The programme has played a crucial role in fostering academic and

research growth by providing financial support to a vast network of 3072 departments and PG colleges with an allocated budget of approximately Rs 3130.82 crores. This consistent support has significantly contributed to the advancement of scientific and technological endeavours across various universities and colleges, fuelling innovation and progress in India's educational landscape.

(c) Sophisticated Analytical and Technical Help Institutes (SATHI) Centres: These Centres organizes training program for researchers, MSME and start-ups for sensitization and utilization of high-end equipment and provides appropriate level platform for networking and to explore possibilities for collaborative research and sharing of data, among the participants.

(d) Promotion of University Research and Scientific Excellence" (PURSE): The Scheme aims to bolster the Research and Development (R&D) foundation of universities nationwide. The primary objective is to enhance the research capabilities of Indian universities, fostering a robust research ecosystem and strengthening their R&D bases.

(e) Women in Science and Engineering-KIRAN (WISE-KIRAN): ensures the participation of women in the field of Science and Technology (S&T) through various gender-enabling programmes. The various components of the Scheme for improving the exposure of women to Research and Development are given below.

- **The WISE Fellowship Programme aims to provide support to women who want to pursue a Ph.D and Post Doctorate**
- **Women's Instinct for Developing and Ushering in Scientific Heights & Innovations (WIDUSHI): WIDUSHI Programme aims to encourage and support senior women scientists to conduct research in interdisciplinary areas of Science & Technology**
- **WISE Internship in Intellectual Property Rights (WISE-IPR) – WISE-IPR programme provides one-year training to women in the area of Intellectual Property Rights in order to develop a core professional skill in this domain**
- **Women International Grant Support (WINGS): WINGS Programme provides opportunities to Indian Women scientists**

to undertake research in the International research labs and academic institutions

- **Consolidation of University Research for Innovation and Excellence (CURIE): CURIE Programme provides support to women institutions for establishing State-of-the art research infrastructure to enhance research facilities and improving R&D activities in order to create excellence in Science & Technology (S&T) domain**
- **Vigyan Jyoti programme aims to encourage girls to pursue higher education and career in STEM (Science, Technology, Engineering and Mathematics) especially in the areas where women participation is low in order to balance gender ratio across the streams**

(f) The Anusandhan National Research Foundation (ANRF), erstwhile Science and Engineering Research Board (SERB) provides a wide range of fellowship which had increased the exposure of students to foster research and innovation in science and technology.

4. Department of Higher Education:

(a) The Prime Minister's Research Fellowship (PMRF) Scheme: PMRF was introduced in 2018, with the objective to attract top talent to doctoral research in India, particularly in Science and Technology, by offering attractive fellowships at institutions like IITs, IISc, and IISERs. The PMRF scheme aims to improve the quality of research in higher educational institutions and foster innovation. The scheme is offered at all IITs, IISERs, Indian Institute of Science (IISc) Bangalore, and some top Central Universities/NITs that offer science and/or technology degrees. The fellowship covers a research grant of Rs. 2 lakhs per year (up to Rs. 10 lakhs for five years). A new version of the PMRF scheme, PMRF 2.0, was announced in the current budget with the introduction of 10,000 fellowships over the next 5 years to boost R&D and provide enhanced PhD fellowships. Industry participation in the PMRF program is explored through CSR funding or otherwise to enable industry to sponsor Fellows.

(b) University Grants Commission (UGC): The UGC supports research and innovation in educational institutions through schemes like "Teaching and Research in Interdisciplinary and Emerging Areas," encouraging innovative proposals and specialized courses, and promoting Research Development Cells (RDCs) to foster a strong research ecosystem.

(c) All India Council for Technical Education (AICTE): AICTE supports research and innovation in technical education through various schemes, including the AICTE-Research Promotion Scheme (RPS), AICTE AURA, and by promoting infrastructure development, faculty development, and industry-institute interaction.

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