GOVERNMENT OF INDIA
MINISTRY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF SCIENCE AND TECHNOLOGY
LOK SABHA
UNSTARRED QUESTION NO. 2928
ANSWERED ON 17/12/2025

QUALITY OF RESEARCH INFRASTRUCTURE AND CAPACITY BUILDING IN SCIENTIFIC INSTITUTIONS

2928. SHRI VE VAITHILINGAM:

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

(a) the efforts made to improve the quality of research infrastructure and capacity building in scientific institutions to support innovation nationwide;

(b) the support provided for initiatives like the PM Research Fellowship and Deep-Tech Fund of Funds to encourage advanced research and entrepreneurship in frontier technologies;

(c) the Government's approach to creating public-private innovation hubs that promote shared resources and accelerate commercialization; and

(d) the strategies to increase awareness and participation in science and technology among young people in smaller cities and rural areas?

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

(a) The Government has made several concerted efforts to improve the quality of research infrastructure and capacity building in academic and scientific institutions for fostering a robust, innovation-driven Research & Development (R&D) ecosystem in the country. The Ministry of Science and Technology has launched several need-based Schemes and Programmes, Mission-Mode Projects, and Strategic Initiatives to improve the quality of research infrastructure and build capacity for innovation in India. Details of significant initiatives are given in Annexure-I.

(b) The Government is providing substantial financial and structural support for the Prime Minister's Research Fellowship (PMRF) and the Deep-Tech Fund of Funds (DTFoF) to encourage advanced research and entrepreneurship in frontier technologies. The details are given below:

The Prime Minister's Research Fellowship (PMRF) Scheme: PMRF Scheme 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 ₹ 2,00,000/- (up to ₹ 10,00,000/- for five years) with a monthly fellowship of ₹ 70,000 for the first two years, increasing to ₹ 75,000 in the third year, and ₹ 80,000 in the fourth and fifth years. A new version of the PMRF scheme, PMRF 2.0, was announced during budget session of FY 2025-26 with the introduction of 10,000 fellowships over the next 5 years to boost R&D and provide enhanced PhD fellowships to build a pipeline of highly skilled researchers and link them with potential industry partners for research projects, fostering industry-academia collaboration.

Deep-Tech Fund of Funds (DTFoF): The Department for Promotion of Industry and Internal Trade (DPIIT) led DTFoF is a significant initiative of the government announced in the 2025 Budget, committing ₹10,000 Crores to channel long-term capital into early-stage, high-potential deeptech Startups, moving beyond traditional support to foster innovation in sunrise sectors including Artificial Intelligence, Quantum Computing and Robotics, Biotechnology and Biomanufacturing, Semiconductors and Space technologies, Clean Energy and Advanced Manufacturing etc. The initiative aims at addressing low private sector R&D expenditure by providing low-cost, long-term capital and encouraging partnerships between academia, research labs, and industry to commercialize capital-intensive, high-impact innovations.

The DTFoF is also a key component under the larger ₹ 1 Lakh Crore Research, Development, and Innovation (RDI) Scheme of DST, aiming to catalyse private sector investment in deep-tech Startups. Long-term, low-interest loans and equity-based risk capital will support private-sector R&D in sectors like space, bio-manufacturing, green hydrogen, quantum technologies, advanced materials etc. A Special Purpose Fund (SPF) is being set up under the Anusandhan National Research Foundation (ANRF) to serve as the first-level custodian. The first tranche of the RDI Fund is being allocated to Technology Development Board (TDB) and BIRAC as second-

level fund managers. By providing long-term, low-interest loans or equity support, the DTFoF de-risks investments for private venture capital, bridging the gap between lab research and market readiness, thus reducing reliance on foreign technology.

(c) The Government had initiated various Schemes, Programmes and Missions including Policy and Financial Frameworks for creating public-private innovation hubs to accelerate the translation of research into marketable products through shared resources. Significant initiatives are given in Annexure – II.

(d) The Ministry implements several initiatives to increase awareness and participation in science and technology among young people in smaller cities and rural areas, primarily through various STEM based activities and outreach programmes. The details are given in Annexure – III. These efforts collectively aim to make science accessible, inclusive, and aspirational, thereby connecting youth from smaller towns and rural regions with technology-driven opportunities and fostering a science-led, innovation-oriented rural ecosystem.

ANNEXURE-I

1. Department of Science and Technology (DST)

DST is implementing various Schemes and programmes for establishment and upgradation of research facilities for strengthening the research ecosystem in the country thereby facilitating capacity building and promoting innovation in academic institutions. The details are given below:

(a) Fund for Improvement of S&T Infrastructure (FIST): The Scheme 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 3285 departments and PG colleges with an allocated budget of approximately Rs 3200.00 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.

(b) Promotion of University Research and Scientific Excellence" (PURSE): The Scheme aims to strengthen the research and development (R&D) infrastructure at universities, enabling them to conduct mission-oriented research in various areas of Science and Technology (S&T) aligned with national priorities. The scheme encourages universities to leverage their areas of strength and form specialized teams with well-defined objectives to drive research efforts. So far, 91 Universities have been supported under PURSE.

(c) Sophisticated Analytical Instrument Facilities (SAIF): Fifteen SAIF Centres were established in different parts of the country to provide the facilities of sophisticated analytical instruments to the researchers in general and specially from the institutions which do not have access to such instruments to pursue R&D activities.

(d) Sophisticated Analytical and Technical Help Institutes (SATHI) Centres: These Centres are professionally managed and offering shared access to cutting-edge S&T infrastructure under one roof. They support S&T-led innovation, start-ups, technology development, and research in emerging areas. So far, 5 national-level SATHI facilities have been established at Indian Institute of Technology, Delhi, Indian Institute of Technology, Kharagpur, Banaras Hindu University, Varanasi, Indian Institute of Technology, Hyderabad and Birla Institute of Technology and Science, Pilani.

(e) Support for the Upgradation, Preventive Repair, and Maintenance of Equipment (SUPREME): The programme aims to revitalize major analytical instrumentation facilities established through DST-funded projects. The programme provides financial support for the repair, upgradation, maintenance, retrofitting, or acquisition of additional attachments to enhance the functional capabilities of existing analytical instrumentation facilities across various institutions/laboratories/academic institutions and thereby extend the lifespan of equipment.

(f) Consolidation of University Research for Innovation and Excellence (CURIE): CURIE Programme specifically support women's universities and colleges to build state-of-the-art research infrastructure and boost R&D, fostering innovation, enhancing gender equity in STEM.

(g) Autonomous Institutions (AI's): DST has 16 premier autonomous research institutions across the country, which house world-class laboratories with sophisticated equipment and R&D infrastructure for cutting-edge research and innovation in specialized areas like Astronomy & Astrophysics, Biomedical Technology, Genomics, Immunology, Quantum Computing, Nano Science and Technology, Materials, Energy etc.

(h) Fellowship Programmes for S&T Capacity Building: DST has several fellowship programmes like WISE Fellowships, INSPIRE Internship, Scholarship for Higher Education (SHE), INSPIRE Fellowship and INSPIRE Faculty Fellowship etc for human capacity building enabling students to develop their skills and pursue opportunities in scientific research. The Anusandhan National Research Foundation (ANRF), erstwhile Science and Engineering Research Board (SERB) also provides a wide range of

fellowship which had increased the exposure of students to foster research and innovation in science and technology.

2. Department of Biotechnology (DBT)

The steps taken by DBT to improve the quality of research infrastructure and capacity building in scientific institutions to support innovation nationwide are given below:

(a) Research Resource, Service Facility and Platform (RRSFP) Programme: The RRSFP programme of DBT identify gaps and strengthen the existing framework of research institutions and universities through the following programmes:

***(i) DBT- Boost to University Interdisciplinary Life Science Departments for Education and Research Programme (DBT-BUILDER)*: BUILDER focuses to upgrade 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.**

***(ii) DBT - Scientific Infrastructure Access for Harnessing Academia University Research Joint Collaboration (DBT-SAHAJ)*: The primary goal of DBT-SAHAJ is to create "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. Launched in 2018–19, the DBT-SAHAJ portal significantly enhanced the visibility of DBT-supported facilities. Building on this success, the newly developed Unified Online Portal for Utilization of Resources/Facilities now offers a centralized system for booking, accessing, and monitoring DBT-funded equipment across the country. With all DBT–BRIC institutes now integrated, the platform promotes transparency, expands nationwide access, minimizes duplication of resources, and strengthens the foundation for a seamlessly connected national research infrastructure ecosystem.**

(b) Biotechnology Industry Research Assistance Council (BIRAC): DBT through BIRAC, has undertaken multiple initiatives to strengthen research infrastructure and build national innovation capacity. BIRAC has established 94 bio-incubation and pre-incubation centres across 25 States/UTs, including Tier 2/3 locations, offering shared laboratories, equipment, mentorship, IP/regulatory support and entrepreneurship training. Early-stage and translational research is supported through schemes such as BIG, SPARSH, SEED, LEAP, SBIRI, BIPP, and PACE, enabling proof-of-concept development, validation and commercialization. BIRAC has also strengthened national biopharma capabilities under the National Biopharma Mission and Ind-CEPI, supporting advanced testing facilities, immunogenicity labs, clinical trial capacity building, and Quality Management System (QMS) accreditation across key institutions.

(c) Fellowship and Associateship Programs: BDT offer a wide range of fellowships to nurture scientific talent at different career stages, including the DBT-Junior Research Fellowship, Research Associateship Program (DBT-RA Program), Ramalingaswami Re-Entry Fellowship, and the Tata Innovation Fellowship for Capacity Building and Human Resource Development .Various training programs, workshops, and short-term courses are conducted to develop skilled manpower in emerging areas like clinical trials, vaccine development, and bioinformatics.

3. Council of Scientific & Industrial Research (CSIR)

CSIR's primary effort in capacity building is the comprehensive Capacity Building and Human Resource Development (CBHRD) scheme with a substantial outlay, covering all R&D institutions and universities across India to expand the pool of high-quality human resources in the S&T sector. CSIR, under its "Capacity Building and Human Resource Development" Scheme, provides doctoral and postdoctoral fellowships to young budding researchers who are guided by their research supervisors and principal investigators in the art of modern scientific research and innovation in science and technology. These researchers are contributing in the scientific publications, patents, technology, processes, and overall development of S&T in the country. CSIR continuously upgrades and modernizes its network of 37 national

laboratories and an innovation complex to create an enabling infrastructure for cutting-edge R&D. Key efforts include Modernization and Upgradation of Equipment, Mission Mode Projects (MMPs), Industry Collaboration and Intellectual Property (IP) Management.

ANNEXURE-II

1. Department of Science and Technology (DST)

(a) The National Quantum Mission (NQM) promotes shared resources and accelerates commercialization primarily through the establishment of Thematic Hubs (T-Hubs), which foster collaboration and provide Startups with funding, mentorship, and access to national infrastructure. T-Hubs established at IISc Bengaluru, IIT Madras, IIT Bombay, and IIT Delhi act as central nodes for research, bringing together researchers from numerous institutions across India to work on key strategic areas like Quantum Computing, Quantum Communication, Quantum Sensing & Metrology and Quantum Materials & Devices. The strategy for resource sharing involves a "hub-and-spoke" model centered around four specialized T-Hubs. The T-Hubs are encouraged to provide Startups and other institutions access to their specialized, and often expensive, national fabrication and research facilities on a reasonable payment basis. The mission provides direct financial support and incubation opportunities to quantum Startups and MSMEs. By involving relevant user agencies, government, and private sector partners at an early stage, the NQM helps build confidence in the products developed by Startups and facilitates their integration into real-world applications.

(b) The National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS) promotes shared resources and accelerates commercialization primarily through a network of specialized Technology Innovation Hubs (TIHs) that foster collaboration between academia, industry, and government. Under the mission 25 TIHs are established in reputed academic and R&D institutions across India, operating in a hub-and-spoke model. These hubs serve as focal points for expertise and technology inputs, making advanced facilities accessible to a wide range of stakeholders including private agencies. Under the mission world-class, shared infrastructure and testbeds for R&D in critical areas like autonomous navigation, cyber security, and data analytics etc were developed and the mission facilitated resource pooling and seamless sharing of resources for developing an innovation and start-up ecosystem, providing incubation support, mentorship, and access to funding.

(c) DST through National Initiative for Developing and Harnessing Innovations (NIDHI) program has extended end-to-end Startup support to nurture Startups from ideation to commercialization. It includes a variety

of program components for Startups like PRAYAS - prototyping grant for early-stage innovative ideas, hand-holding support to Startups through Technology Business Incubators, seed funding and acceleration support for rapid scaling of Startup businesses.

(d) Five Technical Research Centres (TRCs) established at SCTIMST Thiruvananthapuram, ARCI Hyderabad, JNCASR Bengaluru, IACS Kolkata and SNBNCBS Kolkata, apart from translation of research into products and processes for greater economic and societal also provide techno-legal-commercial and financial support to scientists, entrepreneurs, and business fraternity to achieve translation of research into products and processes. TRCs have been instrumental in providing R&D translation ecosystem by supporting advancements in technology readiness levels and intellectual properties, streamlining multi-stakeholder involvement (including industry-academia partnerships), technology out-licensing, setting-up platforms for start-ups, and strengthening state-of-the-art R&D infrastructure.

(e) Technology Enabling Centres (TECs) of DST are facilitating commercialization by creating industry-academia linkages and providing access to sophisticated equipment and analytical facilities (like SATHI centres) for researchers, Startups, and industry. TECs are also facilitating IP management, prototyping, and industry liaison, thus building ecosystems for innovation and tech transfer.

2. Department of Biotechnology (DBT)

BIRAC promotes public–private partnership–driven innovation hubs through the BioNEST and E-YUVA schemes that co-fund incubators in academic and private institutions, enabling shared access to high-end resources and accelerating commercialization. BIRAC is expanding a national network of Biofoundries, Bio-AI Hubs, and Biomanufacturing Hubs under the BioE3 framework to support rapid technology development and scale-up. The recently launched BIRAC-EDGE Centres further strengthen public–private innovation linkages for commercialization support, internationalisation, and ecosystem development, with special focus on emerging and underserved regions.

3. Council of Scientific & Industrial Research (CSIR)

CSIR has established a world-class Innovation Complex (CSIR-IC) at Mumbai, to bridge the translational gaps of the technologies and products

by providing high-end scientific infrastructure, expertise and regulatory support to the stakeholders and fully equipped and ready-to-move incubation labs and business-development support to the stakeholders (start-ups, MSMEs, deep-tech companies, CSIR and other public-funded research institutions) in the sectors like healthcare, chemicals, food & nutraceuticals, materials, energy and other relevant areas.

ANNEXURE-III

1. Department of Science and Technology (DST)

(a) National Council for Science & Technology Communication (NCSTC) under DST has several programmes to create awareness and boost the participation of youth in science and technology, especially from smaller cities and rural areas. NCSTC has programs like the National Children's Science Congress (NCSC) for hands-on learning, AWSAR for popular science writing by young researchers and STEM outreach activities like *Vigyan Utsav*, fostering critical thinking, innovation, and career interest via project-based learning and community focus, reaching rural students significantly. NCSTC focuses on outreach activities and also organises science fairs/melas, aimed at sparking curiosity, promoting scientific temper, and making S&T accessible to youth through interactive, community-focused and multimedia approach.

(b) INSPIRE-MANAK (Million Minds Augmenting National Aspiration and Knowledge) boosts youth engagement in S&T by identifying and nurturing original ideas from students through school-level competitions, offering financial rewards and mentoring for prototype development, and providing exposure via district, state, and national exhibitions, ultimately fostering innovation, problem-solving, and potential STEM careers by connecting them with institutions and real-world challenges.

(c) Scheme for Young Scientists & Technologists (SYST) supports young scientists and technologists in undertaking socially relevant research, often with a focus on applying findings in real-world settings. It aims to develop S&T solutions for socio-economic challenges in marginalized communities.

(d) State Science & Technology Programme provides funding to State S&T Councils which run state-specific initiatives like student projects, IPR workshops, and setting up virtual classrooms in rural schools to encourage youth in rural settings and tier 2 and tier 3 cities towards science and technology and create scientific temper.

2. Department of Biotechnology (DBT)

(a) DBT Star College Programme create awareness and facilitate participation in science among students from rural areas by improving laboratory infrastructure, enabling hands-on experimental learning, and enhancing the quality of undergraduate science teaching. The

Programme encourage colleges in remote regions to conduct outreach activities such as school visits, science demonstrations, and local science fairs, thereby exposing students to scientific ideas at an early stage. By fostering critical thinking, practical learning, and interaction with trained faculty, the Programme motivated more rural students to pursue higher education and careers in science and technology.

(b) Several initiatives are being undertaken under Biotech-KISAN and Biotech-based Societal Development Programme to enhance awareness and participation of youth in science and technology in smaller cities and rural areas. The key strategies include:

(i) KVK-led training and demonstrations that expose rural youth to practical biotechnology solutions in crops, livestock, and fisheries, thereby strengthening hands-on learning.

(ii) Farmer fellowships and entrepreneurship programmes, with a special focus on rural youth and women, to encourage grassroots innovation and livelihood generation through science-based interventions.

(iii) Digital outreach tools such as WhatsApp groups, Facebook pages, YouTube channels, and mobile applications that disseminate scientific advisories, package of practices, and success stories, ensuring wider and faster access to knowledge.

(iv) Collaboration with community institutions like Farmer Producer Organizations (FPOs) and farm schools to nurture collective innovation and promote peer learning among young people.

(v) Promotion of success stories—for example, the registration of Abu Saunf-440 fennel under PPV&FRA—which serve as real-life models to inspire rural youth to view themselves as future innovators and biotechnology practitioners.

(c) To enhance participation of youth from Tier 2/3 cities and rural regions, BIRAC has supported a large proportion of incubation and pre-incubation centres outside metros. Schemes such as E-YUVA provide structured fellowships, mentorship and access to facilities for students across 25 States/UTs. BIRAC's outreach programmes, including the National Biotech Entrepreneurship Challenge (NBEC), regional innovation centres, and skill development initiatives in the North-East, have engaged thousands of students and early innovators. Funding schemes

like BIG, SEED and LEAP have significantly supported early-stage innovators in non-metro regions, strengthening grassroots innovation participation nationwide.

3. Council of Scientific & Industrial Research (CSIR)

Several measures have been taken by CSIR to increase awareness and participation in science and technology among young people besides encouraging Stakeholders to utilize the research findings of CSIR laboratories/ institutes. CSIR reaches students and youth in rural areas and small towns and cities through social media where CSIR and its laboratories maintain their social networking pages such as Twitter, Facebook, LinkedIn for dissemination of successful accomplishment of technologies/products for creating curiosity among youth on S&T. From time to time, based on the need of the hour, CSIR also organizes various webinar series and programmes like One Week One Lab (OWOL), One Week One Theme (OWOT) to showcase success stories of CSIR in different streams of science and technology with an aim to create awareness and popularisation of science among masses and rural students. CSIR has also been engaged in connecting school students with scientists through its "Jigyasa" (student-scientist connect) program. The programme envisages opening up the CSIR's national scientific facilities to school children, enabling CSIR scientific knowledgebase and facility to be utilized by school children to instill 'Scientific Thinking' in the young minds.

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