

GOVERNMENT OF INDIA
MINISTRY OF SCIENCE & TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

RAJYA SABHA
UNSTARRED QUESTION NO. 607
ANSWER ON 23.07.2026

Implementation of BioE3 Policy

607: DR. PARMAR JASHVANTSINH SALAMSINH:

Will the **Minister of SCIENCE & TECHNOLOGY** be pleased to state:

- (a) the progress made in implementation of the Biotechnology for Economy, Environment and Employment (BioE3) Policy during 2026-27;
- (b) the sectors prioritised under the Policy and the projects approved thereunder;
- (c) the measures taken to promote industry-academia collaboration and technology commercialisation under the Policy; and
- (d) the framework adopted to monitor the outcomes of the Policy in advancing biotechnology-led economic growth?

ANSWER

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

- (a) The Union Cabinet approved the **BioE3 (Biotechnology for Economy, Environment, & Employment) Policy**, in August 2024, for '*Fostering High-Performance Biomanufacturing*' across the country. The Policy aims to build a resilient biomanufacturing ecosystem in the country for developing bio-based products.

Through extensive national consultations and sectoral expert meetings, **six thematic sectors** were identified for implementation under the Biomanufacturing Initiative. Under these Thematic verticals, 11 call for proposals were announced and over 2000 proposals were received for funding. After several rounds of screening cum-selection-committee meetings, over 270 projects were recommended for funding for product/technology development under the two categories: Discovery and application oriented network research and Bridging the gap for scale up. These projects are currently under various stages of implementation.

In order to augment these sectors, **BioEnablers i.e. including Bio-Artificial Intelligence (AI) Hubs, Biofoundries, and Biomanufacturing Hubs** are being set up across the country. Two call for proposals have been announced so far for setting up of Biofoundries and

Biomanufacturing Hubs to enable start-ups, SMEs, industries and academia with access to shared infrastructure/facilities and resources for pilot & pre-commercial scale biomanufacturing of viable commercial bio-based products. More than 450 proposals were received across six thematic verticals. So far, 17 facilities were given funding support under the first call on bioenablers. DBT and BIRAC have also jointly issued a call for proposals for the establishment of मूलोकर Bio-AI Hubs under the BioE3 policy. In response to the call, a total of 284 Letters of Intent (LoIs) were received and 15 Bio-AI Hubs have been recommended for support. An MoU has also been signed with Meity for access to national AI infrastructure by these Bio AI Hubs.

To advance the BioE3 Policy, the Department has established the '*BioE3-Strain Resource Centre (SRC) for Fostering High-Performance Biomanufacturing*' at BRIC-NCCS, Pune. The BioE3-SRC provides access to high-performance indigenous microbial strains with '*freedom-to-operate*' for commercial utilization, enabling unrestricted commercial use, faster scale-up, regulatory compliance, and retention of economic value within India. The BioE3-SRC thus supports the Make-in-India initiative by reducing reliance on imported strains and technologies and strengthening indigenous biomanufacturing of Bio-based products.

DBT signed a framework MoU with ISRO for collaboration in Space Biotechnology and Space Biomanufacturing and a joint call for proposal was announced. Three DBT-BRIC investigators participated in the AXIOM-4 mission via ISRO-NASA collaboration.

In order to strengthen Centre-State partnerships under the BioE3 Policy, a '*Centre-State Partnership Conclave on BioE3 Policy*' was organised on 7th February 2025 at New Delhi. The deliberations during the Conclave focused on identifying State-specific thematic areas for biomanufacturing, formulating State BioE3 Action Plans, establishing 'BioE3 Cells' by the respective State governments as coordination units for biomanufacturing activities in the State, and aligning regional strengths with national priorities under the BioE3 Policy. BioE3 Cells have so far been notified in Assam, Sikkim, and Himachal Pradesh. A Network proposal has been supported, in Center-State partnership mode involving institutes of BRIC (iBRIC) and S&T council, State Government of Sikkim, to develop and test bio-based solutions in circumventing pest/pathogens of large cardamom and develop disease-tolerant varieties.

A nationwide contest that calls for young innovators and all the citizens of the country to participate under the '***Design for BioE3***' to address real world challenges was issued in two categories (category 1 for school students from class 6 to 12 and category 2 for any citizen of India). From November 2025 to June 2026, a total of 748 entries were received under Category 1 and 4,166 entries under Category 2.

- (b) Through extensive national consultations and sectoral expert meetings, six thematic sectors were identified for implementation under the Biomanufacturing Initiative. These include (i) Bio-based chemicals, biopolymers, active pharmaceutical ingredients (APIs) and enzymes, (ii) Smart proteins and functional foods, (iii) Precision biotherapeutics (iv) Climate-resilient agriculture, (v) Carbon capture and utilization; and (vi) Futuristic marine and space research.

DBT and BIRAC are supporting projects for '**Biomanufacturing of Bio-based chemicals, biopolymers and APIs in production strains**' with '*Freedom-to-operate*' for commercialization. These projects aim at developing import substitutes for shortlisted bio-based chemicals (itaconic acid, succinic acid, squalene, rhamnolipids etc), biopolymers (PLA, PHA, nanocellulose etc.) and APIs (Actinomycin D etc). DBT and BIRAC are supporting 18 projects for '**Biomanufacturing of Enzymes**'. These projects were approved under three categories: (i) enzymes for converting low-cost feedstocks into high-value functional biomolecules, (ii) biomass-hydrolyzing enzymes, and (iii) enzymes for the production of specialty chemicals and active pharmaceutical ingredients (APIs).

Under the '**Smart Protein**' sector, 9 projects have been supported in three categories: a. Fermentation-derived Smart Proteins and Single Cell Proteins; b. Plant-Based Smart Proteins; c. Cell Culture-based Smart Proteins. These projects focus on the development of sustainable and scalable alternative protein production technologies, including novel indigenous protein sources, advanced protein extraction and texturisation technologies, and value-added protein ingredients with improved nutritional, functional, sensory and commercial attributes.

Under '**Precision Therapeutics**', DBT and BIRAC, are facilitating R&D and indigenous manufacturing of CGTs, monoclonal antibodies and mRNA Therapeutics. Projects under CGT range from proof-of-concept to IND-enabling studies in the areas of iPSC-derived therapies for ocular and neurodegenerative disorders, non-viral gene delivery systems, and improved CAR-T cell therapies for cancers. In the thematic sub-sector of mRNA therapeutics, project has been supported on mRNA delivery and in monoclonal antibodies, projects have been supported for developing monoclonal antibodies for cryptococcal meningitis, advanced-stage cancers, rapid detection of Melioidosis. A total of 27 projects are under implementation in this sector.

Under the sector, Biomanufacturing for '**Climate-Resilient Agriculture**' total of 15 proposals have been recommended for support. These projects focus on bio-based agri inputs such as peptides, botanicals etc. for improving nutrient availability, bioprotection or biostimulant activity; microbial consortia formulation and marine biostimulants for crop growth, harnessing traditional/local cultivars for identifying novel genes for biotic stress resilience, identification and validation of target genes for conferring climate resilience in crop plants, genome editing and genomic selection for input use efficiency and climate resilience in crop plants.

The department has implemented 37 Projects under the sector 'Carbon Capture Utilization'. The projects on CCU from point source emissions lay emphasis on providing the CCUS integrated Biomanufacturing solutions for the industrial setups e.g. Cement, Steel, BECCS like Biorefineries. Department has also supported more than 10 partnerships for industry academia to promote the industry academia collaborations on Biomanufacturing through integrated Carbon Capture and Its Utilization.

Under the '**Futuristic Marine Research**' vertical, 11 projects have been supported on sustainable shrimp farming, marine aquafeed development, valorizing cyanobacterial/microalgal biomass, cultivation of edible seaweeds, and sensors for real-time monitoring of seaweed aquaculture. Under '**Futuristic Space Research**', 23 proposals (15 DBT and 8 from

ISRO) received against ISRO-DBT announcement of opportunity in the area of Space biotechnology and biomanufacturing were recommended for implementation.

- (c) Public-private co-creation model is an inherent part of the BioE3 Policy where implementation of the biomanufacturing initiative will combine the available expertise in academia, startups, and industry to accelerate innovative research, pilot-scale production, and pre-commercial manufacturing of commercially viable bio-based products. Under this initiative, DBT provides support to academia through Grant-in-aid. BIRAC supports start-ups and academia through grant-in-aid, and SMEs as well as industries through cofounding and royalty sharing.
- (d) An effective implementation plan has been devised to monitor the outcomes of the Policy. Thematic area-specific Screening-cum-selection committees, Financial Evaluation Committee and Apex Committee comprising members from both Academia and Industry have been set up by the Department to evaluate the proposals received against the Call for proposals and to ensure periodic review of the sanctioned projects.
