

PARLIAMENT QUESTION: Environmental outcomes of BioE3 Policy

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The Department of Biotechnology under the Ministry of Science and Technology, under the aegis of **BioE3 (Biotechnology for Economy, Environment and Employment)** policy, has identified measurable targets in terms of scales, yield and Technology Readiness Level for technology development and scale up thereof for biomanufacturing of the bio-based alternatives to replace fossil-based inputs. Department of Biotechnology (DBT) also supported the projects to develop the biomanufacturing solutions targeted to reduce the import dependency of fossil-based inputs. The digital portal 'Sujivika' launched by the DBT provides biotech import data. The portal facilitates identification of indigenous bio-based products based on import data for **Atmanirbhar Bharat**, targeting to promote domestic manufacturing and reduce dependence on imported chemicals and materials including the fossil-derived chemicals, materials and fuels.

Department has supported research, pilot-scale, and demonstration projects to convert agricultural residues, municipal organic waste, and industrial biogenic waste into advanced fuels, chemicals, and materials for industrial applications. The supported initiatives focus on the development of indigenous technologies for biomass pretreatment, biocatalysts, microbial bioprocesses, and integrated bio-refinery platforms to enable efficient utilization of diverse biomass feedstocks to bring in sustainability integrated with biomanufacturing value chain.

The government through series of consultations with technical expert committees, thematic expert groups, and stakeholder consultations, has assessed potential biotech interventions and technologies that can contribute to India's Carbon Emission Reduction and Net Zero Commitments.

The **BioE3 (Biotechnology for Economy, Environment and Employment)** policy is being implemented through inter-ministerial coordination involving relevant Ministries and Departments to promote convergence and joint efforts. Adapting to the converging and whole of the government approach, the department under the ambit of **BioE3 (Biotechnology for Economy, Environment and Employment)** policy is working closely with line ministries and Departments for integration of the Bio-Enablers such as bio foundries and Bio AI Hubs to provide the scale, strengthening biomass supply chains, technology development, scale-up, mapping of high value chemicals, APIs, enzymes, Smart Proteins etc for further commercialization and regulatory aspects for biomanufacturing.

Following the accepted principles of circular economy and net zero emission, the **BioE3 (Biotechnology for Economy, Environment and Employment)** policy provides the platform to develop and demonstrate the pilot and pre-commercial scale bio manufacturing solutions for replacing the fossil-based inputs, and

to promote the low carbon economy. Key performance indicators for environmental outcomes and progress towards circular bioeconomy include, but, not limited to providing technological solutions to reduce land use, inculcate renewability, reduce greenhouse gas emissions, waste-to-value solutions, and indigenized clean tech solutions through bio manufacturing. Aligning to the indicators for environment outcomes and circular economy, the Department supported major interventions such as biore restoration of degraded ecosystems like Sunderbans, Molecular tools for protected area conservation, Alternatives to single-use-plastics and polymers, converting lignocellulosic, industrial, and organic waste to sustainable aviation fuels, specialty chemicals and biomaterials, engineered enzymes for waste valorization and Carbon Capture Utilization Integrated Bimanufacturing.

This information was given by the Minister of State (Independent Charge) for the Ministry of Science and Technology & Ministry of Earth Sciences Dr. Jitendra Singh in a written reply in Rajya Sabha today.

NKR/AK/MJ/NM

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