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EDITORIAL ANALYSIS

India's \$195 Billion Bioeconomy — From Pharmacy of the World to Biotech Powerhouse

 **ECONOMIC TIMES**

22 March 2026

SUBJECTS COVERED**ECONOMY****SCIENCE & TECH****GS PAPERS****GS3****CURATED & WRITTEN BY****Bharat Choudhary**

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The Economic Times

22 March 2026

GS3

ET

The Economic Times

MAINS RELEVANCE:

GS Paper 3



INTERVIEW ANGLE

"India's bioeconomy has grown 20-fold in a decade to \$195 billion — what structural factors enabled this, and what bottlenecks remain for the \$300 billion target?"

WHY IN NEWS

The India BioEconomy Report 2026 revealed an 18% surge to \$195.3 billion — the highest growth rate in recent years — prompting the editorial to examine whether India can sustain this trajectory to achieve its \$300 billion bioeconomy target by 2030.

The Growth Story

India's bioeconomy has been one of the **quiet success stories** of the Modi government's science policy. From \$10 billion in 2014 to \$195.3 billion in 2025, this nearly 20-fold growth is unmatched by any other science-led sector in India.

The 18% growth in 2025 — adding \$29.6 billion in a single year — was driven by:

- **BioIndustrial (\$90.2 billion):** Biofuels mandate (E20), bioplastics demand, industrial enzyme exports
- **BioPharma (\$64.5 billion):** Biosimilar approvals, vaccine manufacturing scale, COVID-era capacity expansion
- **BioServices (\$26 billion):** India as a contract research and clinical trial hub
- **BioAgri (\$14.6 billion):** Biopesticide adoption, tissue culture, and biofortified crop varieties

Why India Succeeded

1. The Pharma Foundation

India's dominance as the "Pharmacy of the World" — supplying **20% of global generics and 60% of global vaccines** — provided the industrial base, regulatory experience, and workforce for biotech expansion. Serum Institute, Biocon, Bharat Biotech, and Dr. Reddy's are not biotech startups — they are **globally competitive industrial enterprises**.

2. BIRAC's Catalytic Role

The **Biotechnology Industry Research Assistance Council (BIRAC)**, established in 2012 under the Department of Biotechnology, has been a game-changer:

- Funded **5,000+ biotech startups** through grants, equity, and soft loans
- Created **50+ bio-incubators** across India
- Programmes like **SPARSH, BIPP, BIG, and PACE** provide stage-specific funding from idea to commercial scale

3. COVID as Catalyst

The pandemic forced India to build capabilities in mRNA technology, diagnostics manufacturing, and genomic sequencing at unprecedented speed. These investments are now paying dividends in non-COVID applications.

The Bottlenecks for \$300 Billion

The editorial identifies four structural constraints:

- 1 **Regulatory complexity:** India lacks a **single window** for biotech approvals. A transgenic crop needs clearance from GEAC, RCGM, and state governments — a process that can take 5-10 years. BioRRAP (Bio-Risk Regulatory Automation Portal) was launched but adoption is slow.
- 2 **Talent gap:** India produces ~150,000 life science graduates annually but industry absorption is low. **PhD quality in biosciences** needs improvement — CSIR and DBT labs must strengthen industry partnerships.
- 3 **IP protection:** India's Patent Act and compulsory licensing provisions create uncertainty for biotech R&D investments. Biosimilar companies thrive on this ambiguity, but genuine innovation requires stronger IP protection.
- 4 **BioAgri underperformance:** At \$14.6 billion (7.5% of bioeconomy), BioAgri is the weakest link. India has **zero approved GM food crops** other than Bt cotton. The regulatory environment for transgenic crops — especially Bt brinjal and GM mustard — remains politically contentious.

Policy Recommendations

- ❶ **Unified biotech regulator:** A single apex body for all biotech approvals — merging functions of GEAC, RCGM, and related bodies
- ❷ **BioAgri deregulation:** Fast-track gene-edited (not transgenic) crop approvals following the US/EU model
- ❸ **Contract manufacturing policy:** Position India as the global bio-manufacturing hub (like in pharma)
- ❹ **Green bioeconomy push:** Incentivise bioplastics, sustainable aviation fuel from biomass, and bio-based textiles
- ❺ **PhD-industry bridges:** Mandatory industry internships for all biotech PhD scholars

UPSC RELEVANCE

BIRAC, DBT, IBER 2026, bioeconomy data, GEAC, BioRRAP.

MAINS GS-3:

Biotechnology as an economic driver, India's pharma sector, science and technology policy, GM crops debate.

MAINS GS-2:

Government initiatives for innovation — BIRAC model.

ESSAY:

“India's bioeconomy can be the engine of the next development decade — if policy keeps pace with science.”

★ FACTS CORNER — KNOWLEDGEPEDIA

INDIA'S BIOECONOMY:

- 2025 size: \$195.3 billion (18% growth)
- GDP share: 4.8%
- 2030 target: \$300 billion
- Growth: 20-fold in a decade (\$10B → \$195B)

SECTOR BREAKDOWN:

- BioIndustrial: \$90.2B (46%)
- BioPharma: \$64.5B (33%)
- BioServices: \$26B (13%)
- BioAgri: \$14.6B (8%)

KEY INSTITUTIONS:

- DBT: Dept. of Biotechnology (est. 1986)
- BIRAC: Biotechnology Industry Research Assistance Council (est. 2012)
- GEAC: Genetic Engineering Appraisal Committee (under MoEFCC)
- RCGM: Review Committee on Genetic Manipulation (under DBT)

INDIA AS PHARMACY OF THE WORLD:

- 20% of global generic medicines
- 60% of global vaccines
- 50% of global demand for DPT, BCG, measles vaccines
- Serum Institute of India: World's largest vaccine manufacturer by volume

OTHER RELEVANT FACTS:

- Biotech startups funded by BIRAC: 5,000+
- Bio-incubators in India: 50+
- Bt cotton: Only approved GM crop in India (since 2002)
- GM mustard: Approved by GEAC (2022) but field release delayed
- National Biotechnology Development Strategy: 2021-25

Sources: [Economic Times](#), [Business Standard](#), [IBEF](#)

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