



Growth of India's Biotechnology Sector

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Why in News?

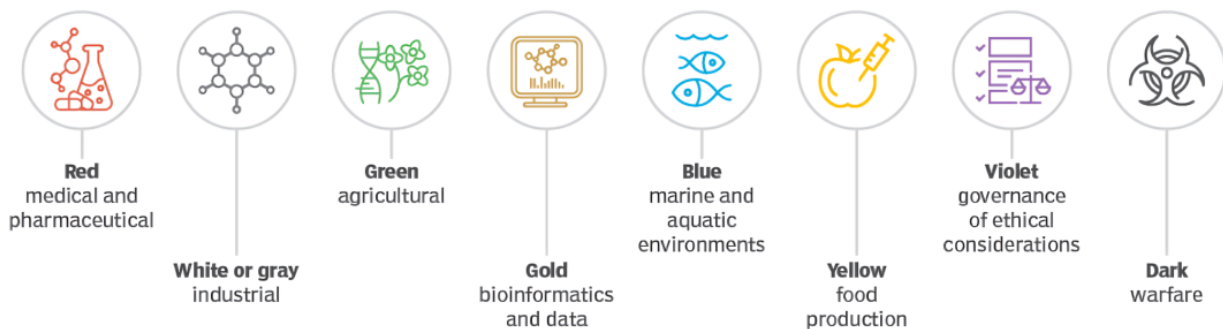
At the “**Emerging Innovations in Biochemistry and Biotechnology**” conference, the **Union Minister of Science & Technology** highlighted the **evolution of India's biotechnology sector** and biotechnology potential of the **Himalayan region**, especially J&K.

What are the Key facts Related to the Biotechnology Sector in India?

- **About:** It is the use of **biological systems, organisms, or their components** to create products and technologies that benefit **agriculture, medicine, industry, and sustainability.**
- **Types:**

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Types of biotechnology



- **Growth & Potential:** **India's bioeconomy** grew over **10 times** in a decade (2014-24), rising from **USD 10 billion** in 2014 to **USD 130 billion** in 2024, with a target of **USD 300 billion by 2030.**
 - **Potential in J&K: Rich flora and medicinal plant** diversity offer potential for pharmaceutical and herbal industries.
 - Biotechnological research can optimize high-altitude crops for climate resilience and productivity.
 - **Aroma Mission, Floriculture Revolution** (commercial flower farming).
 - **Key Breakthroughs in 2024:** Development of the **world's first Human Papillomavirus (HPV) vaccine.**
 - Discovery of '**Nafithromycin**,' a groundbreaking **indigenous antibiotic.**
 - First successful gene therapy experiment for **Hemophilia.**

- **Government's Key Initiatives:** [BioE3 Policy](#), [Anusandhan National Research Foundation \(NRF\)](#), [Bio-RIDE Scheme](#) (2014: 50 biotech startups, 2025: 9,000).
- **Progress in Global Innovation:** India improved its ranking from **80th in 2014** to **39th** in the [Global Innovation Index 2024](#).
 - India ranks **3rd in the Asia-Pacific** and **12th globally** in biomanufacturing.
 - Over **5,352 Indian researchers** now feature in the world's **top 2% of scientists**.

Aroma Mission (Lavender Revolution)

- **About:** Started in J&K, it boosts India's **aroma industry** by promoting aromatic crops and essential oil production.
- **Focus:** Cultivation of **lemongrass, lavender, vetiver, palmarosa** etc for fragrant oils used in **cosmetics, aromatherapy, and food flavoring**.
- **Nodal Agency:** CSIR-Central Institute of Medicinal and Aromatic Plants (**CSIR-CIMAP**), **Lucknow**.
- **Potential Impact:** Over 2000 tonnes of oils worth **Rs 300 crores yearly**, 60 lakh rural jobs, and **Rs 60,000-70,000 per hectare** annual farmer income.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. Mycorrhizal biotechnology has been used in rehabilitating degraded sites because mycorrhiza enables the plants to (2013)

1. resist drought and increase absorptive area
2. tolerate extremes of pH
3. resist disease infestation

Select the correct answer using the codes given below:

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (d)

Q. At present, scientists can determine the arrangement or relative positions of genes or DNA sequences on a chromosome. How does this knowledge benefit us? (2011)

1. It is possible to know the pedigree of livestock.
2. It is possible to understand the causes of all human diseases.
3. It is possible to develop disease-resistant animal breeds.

Which of the statements given above is/are correct?

- (a) 1 and 2 only

(b) 2 only

(c) 1 and 3 only

(d) 1, 2 and 3

Ans: (c)

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