



Argasia Education PVT. Ltd. (GST NO.-09AAPCAI478E1ZH)  
Address: Basement C59 Noida, opposite to Priyagold Building gate, Sector 02,  
Pocket I, Noida, Uttar Pradesh, 201301, CONTACT NO:-8448440231

## CURRENT AFFAIRS



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# INDIA'S BIO-ECONOMY SOARS 16-FOLD IN A DECADE, REACHING \$165.7 BILLION IN 2024

### WHY IN THE NEWS?

India's bio-economy has achieved a remarkable 16-fold growth over the past decade, surging from \$10 billion in 2014 to \$165.7 billion in 2024. This milestone was announced by Union Minister Dr Jitendra Singh during the release of the India Bioeconomy Report 2025 (IBER 2025) at the BIRAC Foundation Day ceremony. The exponential growth reflects India's strategic focus on biotechnology as a key driver of economic expansion, with the sector now contributing 4.25% to India's GDP, exceeding initial expectations. India had initially set a bio-economy target of \$150 billion by 2025, but the sector has already surpassed it a year ahead of schedule. With a Compound Annual Growth Rate (CAGR) of 17.9% over the past four years, India is reinforcing its potential as a global biotech leader.



### WHAT IS BIO-ECONOMY?

Bio-economy refers to an economic system that utilizes biological resources, biotechnology, and bio-based innovations to create sustainable solutions for industries such as healthcare, agriculture, energy, and

manufacturing. It focuses on using renewable biological materials to replace fossil-based resources, enhancing environmental sustainability and economic growth.

#### **Key Components of Bio-Economy:**

- 1. Biotechnology:** Used in healthcare (vaccines, bio-pharmaceuticals), agriculture (genetically modified crops, bio-fertilizers), and industry (biofuels, biodegradable plastics).
- 2. Bio-Resources:** Renewable biological materials like plants, microorganisms, and bio-waste used in food, fuel, and chemicals.
- 3. Sustainable Development:** Reducing reliance on non-renewable resources and promoting circular economy practices.

#### **COMPONENT OF BIO-ECONOMY**

- 1. Biotechnology & Biopharma:** Involves the development of vaccines, biosimilars, gene therapies, and advanced bio-manufacturing techniques to improve healthcare and disease management.
- 2. Bio-Agri & Agri-Tech:** Focuses on genetically modified (GM) crops, bio-fertilizers, bio-pesticides, and precision farming to enhance agricultural productivity and sustainability.
- 3. Bio-Industrial & Bio-Manufacturing:** Includes the production of biofuels, biodegradable plastics, bio-chemicals, and sustainable packaging to reduce environmental impact and promote green alternatives.
- 4. Bio-Energy & Bio-Fuels:** Covers the development of renewable energy sources like ethanol, biodiesel, biogas, and waste-to-energy technologies to reduce dependence on fossil fuels.
- 5. Bio-IT & Digital Bio-Economy:** Integrates AI, Big Data, and bioinformatics in genomics, drug discovery, and precision medicine to accelerate scientific advancements.
- 6. Marine & Environmental Bio-Economy:** Utilizes marine bio-resources for pharmaceuticals, cosmetics, and food while also focusing on bio-remediation and climate change mitigation.
- 7. Bio-Waste Management:** Converts organic waste into bio-energy, bio-compost, and eco-friendly materials, contributing to a circular economy and sustainable waste disposal.
- 8. Bio-Economy Policy & Investments:** Includes government policies, funding programs, and global collaborations to promote biotech startups, research, and innovation in the sector.

#### **GROWTH OF BIO-ECONOMY IN INDIA**

India's bio-economy has witnessed remarkable growth over the past decade, expanding from \$10 billion in 2014 to \$165.7 billion in 2024. This rapid rise represents a 16-fold increase and a Compound Annual Growth Rate (CAGR) of 17.9%. The sector now contributes 4.25% to India's GDP, highlighting its role as a key pillar of economic development. Key factors driving this growth include advancements in biopharma, agriculture, bio-manufacturing, bio-energy, and digital biotech innovations. India has also established itself as a global hub for vaccine production, biosimilars, and biotech startups, reinforcing its leadership in the biotechnology sector.

#### **GOVT INITIATIVES TO PROMOTE BIO-ECONOMY**

- 1. Biotechnology Industry Research Assistance Council (BIRAC):** A key government initiative that supports biotech startups, provides funding and promotes innovation in biotechnology.
- 2. National Biotechnology Development Strategy (NBDS):** A long-term strategic framework aimed at making India a global leader in biotechnology by strengthening research and industry collaboration.
- 3. Atal Innovation Mission (AIM):** Encourages entrepreneurship and innovation in biotechnology through funding, incubation centres, and startup support.
- 4. Biopharma Mission:** Focuses on developing next-generation biopharmaceuticals, strengthening India's position in global biopharma markets.

- 5. Production Linked Incentive (PLI) Scheme for Biotech Sector:** Offers financial incentives to boost domestic biotech manufacturing and reduce dependency on imports.
- 6. Bio-Saarthi Initiative:** A newly launched global mentorship program designed to support biotech startups through structured guidance and networking.
- 7. Waste-to-Wealth Mission:** Encourages bio-waste management, bio-energy production, and circular economy practices to promote sustainability.
- 8. Agri-Biotech Initiatives:** Supports research and development in genetically modified crops, bio-fertilizers, precision agriculture, and climate-resilient farming techniques.

## IMPORTANCE OF BIO-ECONOMY

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- 1. Boosts Economic Growth and Employment:** The bioeconomy plays a crucial role in GDP growth, providing millions of jobs in biotech research, bio-manufacturing, and healthcare.
- 2. Enhances Food Security and Agricultural Sustainability:** Biotechnology helps improve crop yields, develop climate-resistant crops, and promote sustainable farming practices.
- 3. Revolutionizes Healthcare and Medicine:** The sector enables the development of vaccines, biosimilars, personalized medicine, and cutting-edge healthcare solutions.
- 4. Supports Environmental Sustainability:** Bio-based innovations reduce dependence on fossil fuels, encourage the use of renewable energy, and promote bio-waste management.
- 5. Strengthens India's Global Leadership in Biotechnology:** The rapid expansion of India's bio-economy positions the country as a key player in global biotech innovation and trade.

## CHALLENGES TO HARNESS THE POTENTIAL OF BIO-ECONOMY IN INDIA

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- 1. Regulatory Barriers and Policy Gaps:** The complex and lengthy approval process for biotech innovations slows down research and commercialization.
- 2. Limited Funding and Private Sector Investment:** While government support is increasing, private-sector investments in biotech R&D are still not at par with global standards.
- 3. Inadequate Infrastructure and Skilled Workforce:** There is a need for more biotech research labs, world-class manufacturing facilities, and trained professionals to support industry growth.
- 4. Public Awareness and Acceptance Issues:** Misinformation and resistance to genetically modified organisms (GMOs) and bio-based products hinder widespread adoption.
- 5. Intellectual Property (IP) and Patent Challenges:** Ensuring strong patent protection for biotech innovations remains a challenge, affecting global competitiveness.
- 6. Limited Market Access and Global Competition:** Indian biotech companies need better access to international markets and stronger global trade strategies to compete with developed nations.

## WAY FORWARD

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- 1. Simplify Regulatory Frameworks:** Streamlining approval processes will encourage faster biotech innovation and commercialization.
- 2. Increase Investment in Biotech R&D:** Expanding funding opportunities for startups and research institutions will drive new discoveries and advancements.
- 3. Develop World-Class Biotech Infrastructure:** Establishing more biotech parks, incubation centres, and advanced research labs will create a strong ecosystem for growth.
- 4. Enhance Skill Development and Education:** Training professionals in bio-manufacturing, digital biotechnology, and bioinformatics will help meet industry demands.
- 5. Promote Public Awareness and Acceptance:** Educating people about the benefits of biotech innovations will encourage their adoption in agriculture, healthcare, and industry.

**6. Strengthen International Collaborations:** Partnering with global biotech leaders will help India access cutting-edge research, expand its market reach, and enhance innovation.

**7. Focus on Sustainability and Circular Bio-Economy:** Encouraging bio-waste management, renewable energy, and eco-friendly materials will ensure long-term environmental benefits.

## CONCLUSION

India's bio-economy has experienced unprecedented growth, surpassing its 2025 target ahead of time. With strong government support, rising investments, and ongoing innovation, India is poised to become a global biotech powerhouse, driving economic growth, sustainability, and technological advancements. Additionally, fostering a robust biotech startup ecosystem, enhancing public-private partnerships, and leveraging digital transformation will further accelerate India's leadership in the bio-economy sector, ensuring long-term growth and global competitiveness.

## PRELIMS QUESTIONS

**Q. Consider the following statements regarding India's bio-economy:**

1. India's bio-economy contributes 4.25% to its GDP.
2. The Bio-Saarthi Initiative is a global mentorship program for biotech startups.
3. The Production Linked Incentive (PLI) scheme is exclusively for bio-manufacturing.

**Which of the statements is/are correct?**

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. 1, 2, and 3

**Answer: A**

## MAINS QUESTIONS

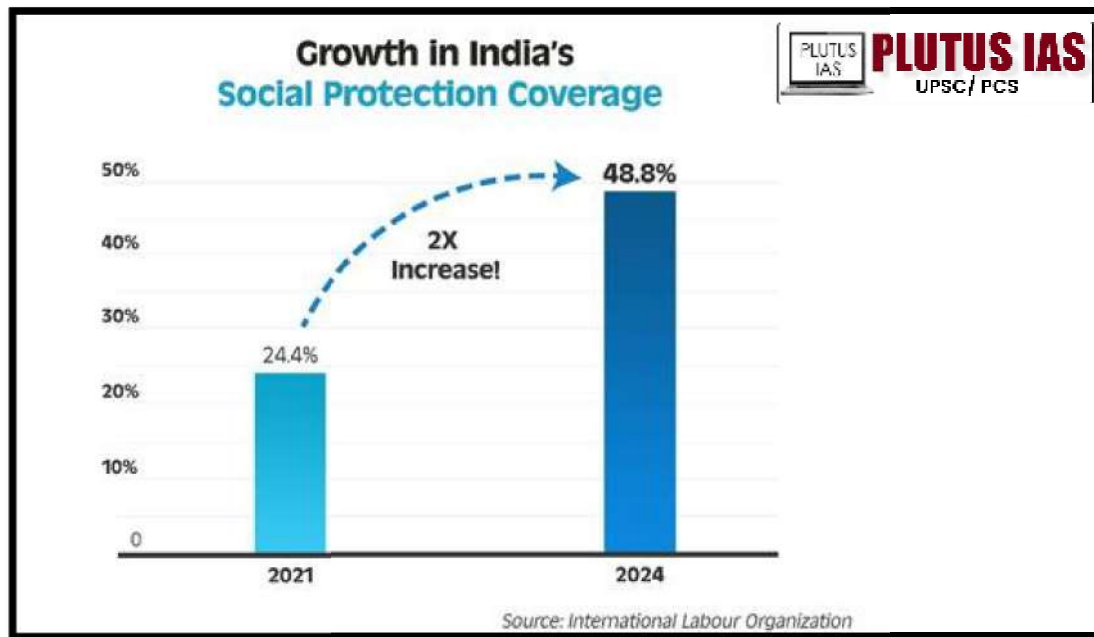
**Q. Discuss the growth, significance, and challenges of India's bio-economy. Suggest measures to strengthen this sector. (250 words, 15 marks)**

# INDIA'S SOCIAL SECURITY COVERAGE DOUBLES

## WHY IN THE NEWS?

India's social protection coverage has seen a remarkable rise, doubling from 24.4% in 2021 to 48.8% in 2024, as per the International Labour Organization's (ILO) World Social Protection Report (WSPR) 2024-26. This significant expansion is attributed to key government initiatives that have broadened access to health insurance, pensions, and employment support for millions. According to the Ministry of Labour and Employment, nearly 920 million people (65% of the population) are now covered by at least one form of social protection, marking a major milestone in India's welfare landscape. This progress has also contributed to a 5-percentage point increase in global social protection coverage, highlighting India's role in shaping international welfare outcomes.





### SOCIAL SECURITY COVERAGE IN INDIA

The World Social Protection Report is a comprehensive assessment published periodically by the International Labour Organization (ILO), a specialised agency of the United Nations dedicated to labour rights and social justice. The report evaluates social protection systems globally, examining their coverage, effectiveness, and progress in ensuring social security for diverse populations. By offering a detailed analysis of policies and trends, it serves as a key resource for governments, policymakers, and researchers working towards stronger and more inclusive welfare systems.



The 2024–26 edition of the report is centred on universal social protection for climate action and a just transition. For the first time, it incorporates trend data, providing a more dynamic perspective on global progress. It presents an extensive set of global, regional, and country-level statistics on social protection coverage, benefits provided, and public expenditure. Additionally, a regional companion report for Asia and the Pacific supplements the global findings by offering a deeper analysis of social protection developments in the region. This companion report highlights key challenges, priorities, and the intersection of social protection and climate action, considering the unique socio-economic and environmental conditions of Asia and the Pacific.

### EXPANDING SOCIAL SECURITY

- 1. Ayushman Bharat:** As of March 26, 2025, 39.94 crore Ayushman Cards have been issued under Pradhan Mantri Jan Arogya Yojana (AB-PMJAY), offering free health coverage of up to ₹5 lakh per family. The scheme is accessible at 24,810 empanelled hospitals nationwide.
- 2. Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY):** Launched to address economic hardships caused by the COVID-19 pandemic, the scheme provides free food grains to vulnerable populations. As of December 2024, 80.67 crore people are receiving free food grains, close to the intended coverage of 81.35 crore beneficiaries.
- 3. EShram Portal:** Introduced on August 26, 2021, to create a National Database of Unorganised Workers (NDUW), this initiative offers a Universal Account Number (UAN) to workers for enhanced social security. As of March 3, 2025, over 30.68 crore unorganised workers have registered, with 53.68% of them being women.
- 4. Atal Pension Yojana (APY):** Launched on May 9, 2015, APY aims to provide universal social security, particularly for the poor, underprivileged, and unorganised sector workers. Along with Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY) and Pradhan Mantri Suraksha Bima Yojana (PMSBY), it strengthens the country's social security system. As of December 31, 2024, 7.25 crore beneficiaries have enrolled in APY, with a total accumulated corpus of ₹43,369.98 crore.
- 5. Poverty Reduction:** Over the past decade, 24.8 crore people have escaped multi-dimensional poverty due to several social security measures, reflecting the far-reaching impact of government interventions.

### IMPORTANCE OF SOCIAL SECURITY

- 1. Financial Protection Against Uncertainties:** Provides financial assistance during retirement, unemployment, disability, or illness. Helps individuals and families sustain their livelihoods in difficult times.
- 2. Poverty Reduction and Economic Stability:** Protects vulnerable populations from falling into extreme poverty. Encourages economic stability by ensuring basic income security.
- 3. Access to Quality Healthcare:** Reduces financial burden on families by covering medical expenses. Government schemes like Ayushman Bharat provide free health coverage to millions.
- 4. Food Security for Vulnerable Populations:** Ensures access to essential nutrition through programs like Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY). Reduces malnutrition and improves overall public health.
- 5. Empowerment of Unorganised Workers:** Initiatives like EShram Portal provide social security coverage to unorganised workers. Ensures protection and benefits for daily wage earners, gig workers, and self-employed individuals.
- 6. Encourages Savings and Retirement Planning:** Schemes like Atal Pension Yojana (APY) and Employees' Provident Fund Organisation (EPFO) help people save for the future. Ensures financial independence in old age.
- 7. Promotes Inclusive Growth and Development:** Helps bridge the gap between different socio-economic groups. Ensures that all citizens, regardless of income level, have access to essential services.

**8. Strengthens National Productivity:** A healthy and financially secure population contributes to a stronger economy. Reduces dependency on government aid and promotes self-sufficiency.

**9. International Recognition and Development Goals:** Aligns with United Nations Sustainable Development Goals (SDGs), focusing on poverty reduction, healthcare, and decent work. Strengthens India's position as a socially responsible and progressive nation.

#### ISSUE RELATED TO SOCIAL SECURITY IN INDIA

**1. Limited Coverage & Exclusion Errors:** Many unorganised workers, migrant labourers, and daily wage earners lack access to formal social security due to inadequate documentation and identification issues.

**2. Fragmented Implementation:** Multiple schemes under different ministries create inefficiencies, duplication, and difficulties in tracking beneficiaries due to a lack of centralized data.

**3. Financial Constraints:** Insufficient funding and delayed disbursements lead to inadequate benefits and hinder the effective implementation of welfare programs.

**4. Inadequate Pension & Insurance Coverage:** Many informal workers lack pension (EPFO, APY) and insurance (PMJJBY, PMSBY) coverage due to low awareness and accessibility.

**5. Challenges in eShram & Aadhaar Integration:** Digital illiteracy, lack of internet access, and Aadhaar authentication issues prevent many unorganised workers from registering and availing benefits.

**6. Corruption & Leakages:** Middlemen, bureaucratic delays, and ghost beneficiaries cause fund leakages in schemes like MGNREGA and food distribution programs.

**7. Inadequate Support for Migrant Workers:** Limited portability of welfare benefits across states restricts migrant workers' access to ration, healthcare, and employment schemes despite ONORC.

**8. Low Awareness & Digital Divide:** Many, especially in rural areas, remain unaware of entitlements due to digital illiteracy, language barriers, and poor access to technology.

#### WAY FORWARD

**1. Develop a Universal Social Security System:** Create an inclusive framework ensuring seamless and portable benefits across all employment sectors.

**2. Strengthen Digital & Data Infrastructure:** Establish a centralized database for efficient tracking, reducing duplication, and ensuring transparency.

**3. Enhance Financial Support & Timely Disbursement:** Increase budgetary allocations and ensure the prompt release of funds to improve benefit delivery.

**4. Expand Pension & Insurance Coverage:** Boost awareness and simplify access to pension (EPFO, APY) and insurance (PMJJBY, PMSBY) schemes.

**5. Improve eShram & Aadhaar Accessibility:** Address digital literacy challenges, provide offline registration options, and resolve authentication issues.

**6. Curb Corruption & Leakages:** Strengthen monitoring mechanisms, promote transparency, and use technology to eliminate fund misappropriation.

**7. Support Migrant Workers with Portable Benefits:** Strengthen ONORC and other welfare schemes to ensure accessibility across states.

**8. Bridge the Digital & Awareness Gap:** Conduct outreach programs, improve internet connectivity, and offer multilingual, user-friendly platforms.

#### CONCLUSION

India's strides in expanding social protection reflect a strong commitment to inclusive welfare and economic security. The doubling of coverage, as highlighted in the International Labour Organization's World Social Protection Report 2024–26, underscores the impact of key initiatives such as Ayushman Bharat, PMGKAY,

and the eShram portal in ensuring financial stability, healthcare, and food security for millions. The launch of the Social Protection Data Pooling Exercise further strengthens these efforts by enhancing data-driven policymaking and addressing gaps in existing assessments. As India continues to refine its social security framework in collaboration with the ILO, its approach serves as a model for balancing welfare expansion with economic growth.

### PRELIMS QUESTIONS

**Q. With reference to social security schemes in India, consider the following statements:**

1. Ayushman Bharat (PM-JAY) provides free health insurance coverage of up to ₹10 lakh per family.
2. EShram Portal aims to register workers from the organized sector to provide them with financial benefits.
3. Atal Pension Yojana (APY) is a pension scheme specifically designed for workers in the unorganized sector.

**How many of the above-given statements are correct?**

- A. Only one
- B. Only two
- C. All three
- D. None

**Answer: B**

### MAINS QUESTIONS

**Q. Discuss the key challenges in India's social security system and suggest measures to ensure universal coverage. (250 words, 15 marks)**

**PLUTUS IAS**  
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Our Centers Delhi | Chandigarh | Shimla | Bilaspur

info@plutusias.com

8448440231

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