



# INDIA BIOECONOMY REPORT 2023



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This report has been prepared for “Make In India Facilitation Cell for Biotechnology” of Biotechnology Industry Research Assistance Council (BIRAC) by Association of Biotechnology Led Enterprises (ABLE). The report is written by **Narayanan Suresh**, Chief Operating Officer of ABLE and **Srinivas Rao Chandan**, Editorial Consultant for ABLE under the able guidance of **Mr G S Krishnan**, President, ABLE

# CONTENTS

|   |            |
|---|------------|
| <b>BioEconomy Brilliance</b>  | <b>04</b>  |
| <b>Revised India BioEconomy Estimates For 2020 And 2021</b>   | <b>07</b>  |
| <b>Foreword: Dr Jitendra Singh, Minister of State (Independent Charge) of the Ministry of Science and Technology.</b> | <b>08</b>  |
| <b>From DBT Secretary's Desk: Dr Rajesh Gokhale, Secretary, Department of Biotechnology (DBT) and Chairman, BIRAC</b> | <b>10</b>  |
| <b>IBER 2023 Research Methodology</b>   | <b>12</b>  |
| <b>Executive Summary</b>  | <b>18</b>  |
| Key Highlights Of India's BioEconomy  | 19         |
| Regional & Sectoral Analysis  | 20         |
| Startups  | 22         |
| Biotech Investment Landscape  | 23         |
| BioEconomy Projections 2030   | 28         |
| <b>Overview</b>   | <b>33</b>  |
| India's BioEconomy Booms  | 34         |
| Key Segments & Subsegments  | 38         |
| Regional Overview   | 42         |
| Future Forecast   | 43         |
| <b>Startup Ecosystem</b>  | <b>45</b>  |
| Biotech New Startups in 2022  | 46         |
| Top States for New Startups   | 50         |
| Analysis of Cumulative Startups   | 52         |
| Regional & Sectoral Analysis of Cumulative Startup Base   | 53         |
| BIRAC's Initiatives   | 55         |
| <b>Biotech Investments</b>  | <b>57</b>  |
| Key Insights  | 58         |
| PE Investments by State   | 62         |
| Top Deals   | 64         |
| <b>Innovation Ecosystem</b>   | <b>69</b>  |
| Empowering Emerging Biotech Enterprises   | 70         |
| Dynamic Landscape of Bioincubators  | 74         |
| New BioClusters   | 80         |
| <b>New Product Releases in 2022</b>   | <b>86</b>  |
| <b>Policy Framework</b>   | <b>97</b>  |
| Regulatory Developments   | 98         |
| BioMedical Policy   | 100        |
| BioIndustrial Policies  | 101        |
| Biotech Policies in Various States  | 102        |
| <b>Key Biotech Developments in 2022</b>   | <b>110</b> |
| <b>Forecast &amp; Recommendations</b>   | <b>115</b> |
| Outlook and Conclusions   | 116        |
| Insights from Industry Leaders  | 120        |
| <b>Acknowledgements and Sources</b>   | <b>122</b> |

# 01

## **\$28 MILLION DAILY IN BIOAGRI BIOECONOMY**

The cotton crop production for the year stands at 34.2 million bales, making a substantial contribution to the BioAgricultural BioEconomy valued at \$10.23 billion. On a daily basis, this translates to approximately \$28.05 million, showcasing the consistent economic output of Bt cotton within the BioAgri sector. Monthly, the cotton crop production reaches around 2.85 million bales, contributing significantly to the monthly BioEconomy of the BioAgri sector, which amounted to \$852 million.

# BIOECONOMY BRILLIANCE

## A Glance at India's Top 10 Triumphs in 2022

# 03

## **\$38 MILLION DAILY VACCINES BIOECONOMY**

The BioPharma Vaccines (non-Covid alone) market makes a significant daily contribution of approximately \$38 million, underscoring its substantial impact on the biopharmaceutical sector. On a monthly basis, this market adds around \$1.16 billion, highlighting its critical role in public health and reinforcing India's position as a key player in vaccine development and distribution. India notably leads global vaccine supply by volume, producing nearly 2 billion doses annually.

# 02

## **\$30 MILLION BIOECONOMY FROM DAILY DIAGNOSTICS TESTS:**

In 2022, the diagnostic market in India witnessed robust growth, buoyed by favorable macroeconomic conditions. The total bioeconomic value of Diagnostics, excluding medical devices, surged to \$10.8 billion. India conducted approximately 600-700 million diagnostics tests annually, with a notable daily average of almost 2 million tests. The monthly value of diagnostics within the BioEconomy reached \$0.9 billion, marking a 1.5-fold increase from 2018. Including medical devices, the daily value of the diagnostics BioEconomy amounted to \$52.60 million, equivalent to a monthly value of \$1.6 billion.

# 04

## \$46 MILLION DAILY IN BIOTHERAPEUTICS BIOECONOMY

The BioPharma - Therapeutics segment commands an annual value of \$16.8 billion, showcasing its strong presence in the broader biopharmaceutical industry. On a daily basis, this sector generates approximately \$46.03 million in the BioEconomy. Monthly, the BioPharma - Therapeutics segment contributes around \$1.4 billion, emphasizing its substantial role in shaping the industry.

# 05

## \$48.22 MILLION BIOECONOMY CONSIDERATION OF ENZYMES (POULTRY AND AQUA)

Enzymes play a crucial role in both Poultry and Aqua (Shrimp) bioindustries, contributing to their respective annual BioEconomies of \$10.3 billion and \$7.3 billion. These segments together form a robust \$17.6 billion in BioEconomy, equating to \$48.22 million daily or \$1.47 billion per month. The use of enzymes enhances feed efficiency, digestion, and overall health in both poultry and aqua farming operations, emphasizing their integral role in sustainable BioIndustrial practices.

# 06

## \$73 MILLION DAILY IN THE BIOETHANOL ECONOMY

India's ethanol production capacity has surged to 947 crore liters, more than doubling from the 2020 level of 427 crore liters, marking a growth of 2.22 times. The government's objective is to achieve a 20% blending of ethanol with petrol by 2025 through the Ethanol Blended Petrol (EBP) Program. The comprehensive BioEconomy value, encompassing Biofuels, Potable alcohol, and alcoholic beverages, amounted to \$26.4 billion. The monthly average for the Bioethanol economy alone stands at \$2.2 billion.

# 07

## 5 SECTORS GENERATE \$1 BILLION MONTHLY BIOECONOMY

- Bioethanol Economy (\$2.2 Billion Monthly)
- Diagnostics BioEconomy (\$1.6 Billion Monthly)
- Biotherapeutics BioEconomy (\$1.4 Billion Monthly)
- Enzymes (Poultry and Aqua) BioEconomy (\$1.47 Billion Monthly)
- Vaccines BioEconomy (\$1.16 Billion Monthly)

# 08

## \$938.8 MILLION RECORD-BREAKING PEVC CAPITAL

In 2022, the biotech industry witnessed a remarkable surge in Private Equity (PE) and Venture Capital (VC) investments, reaching a record-breaking \$938.8 million—an outstanding 19% growth in private equity investments compared to the previous year.

# 09

## 1391 NEW BIOTECH STARTUPS IN 2022

In 2022, 1391 new biotech startups joined the ecosystem, bringing the 10-year total to 6,755. This marked a significant chapter in entrepreneurship with a remarkable 29.8% CAGR. The cumulative base grew to 6,755 from 732 startups in 2015—an impressive multiple of almost 9.2 times in just seven years.

# 10

## 50+ NEW PRODUCTS UNVEILED

The past year marked a wave of innovation with the introduction of nearly 50 cutting-edge products in the life sciences and healthcare domain.

## HIGHLIGHTS

**\$28 Million**  
Daily in  
BioAgri  
BioEconomy

**\$30 Million**  
BioEconomy  
from Daily  
Diagnostics  
Tests:

**\$46 Million**  
Daily in  
Biotherapeutics  
BioEconomy

**\$38 Million**  
Daily  
Vaccines  
BioEconomy

**\$48.22 Million**  
BioEconomy  
Consideration  
of Enzymes  
(Poultry and  
Aqua)

5 Sectors  
generate  
**\$1 Billion**  
Monthly  
BioEconomy

**\$73 Million**  
Daily in the  
Bioethanol  
Economy

**\$938.8 Million**  
Record-breaking  
PEVC Capital

**1,391**  
New Biotech  
Startups in  
2022

**50+**  
New Products  
Unveiled

## REVISED INDIA BIOECONOMY ESTIMATES FOR 2020 AND 2021

India BioEconomy Report 2023 (IBER, 2023) presents the latest numbers for the performance of India's BioEconomy in the calendar year 2022 (January to December). These numbers are significantly higher than the projections that were made for 2022 in the previous edition of India BioEconomy Report 2022.

The significant increase in India's BioEconomy value for 2022 is due to the inclusion of several categories of products in the Bio-Industrial segment that use a key biotech product, enzymes, in a variety of ways to enhance its performance, use as catalysts in the manufacture many other products as the country strives to incorporate more sustainable processes in the entire value chain of such products. In the past reports these aspects of enzyme use and their critical role in several product categories were underplayed due to non-access to some of the related data. This data gap has now been bridged after a lot of discussion with the experts engaged in this segment.

As a best practice, the data for this segment the previous two years too has been revised and hence the India BioEconomy numbers for the years 2020 and 2021 too have been readjusted with the latest estimates. The newly added data pertains to our estimates of biotech-related components used in the manufacture of Potable and Industrial Alcohol, Poultry Feed, Shrimp, Textiles, Biscuits, and Vegetable Oil (Rice Bran). The updated estimates now comprehensively capture the significant impact of the BioIndustrial segment, emphasizing its contribution to a greener world through biotech-derived processes.

The BioEconomy estimates and projections for future years too will reflect the addition of the performance of these product categories. No changes have been made in the estimates of other major segments of BioEconomy such as BioPharma, BioAgri, BioIndustrial, and BioServices. All revisions are related to the BioIndustrial segment.

### BIOECONOMY FIGURES IN INDIA: 2020-2022 (\$ BILLION)

| SEGMENT                   | 2020        | 2021        | 2022        | REVISED     |              |              |
|---------------------------|-------------|-------------|-------------|-------------|--------------|--------------|
|                           |             |             |             | 2020        | 2021         | 2022         |
| <b>BIOPHARMA</b>          | 38          | 39.4        | 49.8        | 38          | 39.4         | 49.8         |
| Vaccines                  | 12.5        | 8.7         | 14.0        | 12.5        | 8.7          | 14.0         |
| Therapeutics              | 7.5         | 10.3        | 16.8        | 7.5         | 10.3         | 16.8         |
| Diagnostics               | 18          | 20.4        | 19.0        | 18          | 20.4         | 19.0         |
| <b>COVID Economy</b>      | 5.5         | 14.6        | 7.7         | 5.5         | 14.6         | 7.7          |
| Covid Vaccines            | 0           | 8.7         | 5.7         | 0           | 8.7          | 5.7          |
| Covid Testing             | 5.5         | 5.9         | 1.9         | 5.5         | 5.9          | 1.9          |
| <b>BIOAGRI</b>            | 11.1        | 10.5        | 11.5        | 11.1        | 10.5         | 11.5         |
| Bt Cotton                 | 10.1        | 9.6         | 10.2        | 10.1        | 9.6          | 10.2         |
| BioPesticides             | 1           | 0.9         | 1.2         | 1           | 0.9          | 1.2          |
| <b>BIOIndustrial</b>      | 5.1         | 10.3        | 14.1        | 20.9        | 36.4         | 59.0         |
| Enzymes                   | 2.6         | 4.3         | 7.3         | 18.4        | 30.4         | 52.3         |
| Biofuels                  | 2.5         | 6.0         | 6.8         | 2.5         | 6.0          | 6.7          |
| BIOIT/Research Services   | 10.5        | 5.4         | 9.3         | 10.5        | 5.4          | 9.3          |
| <b>TOTALS (\$Billion)</b> | <b>70.2</b> | <b>80.1</b> | <b>92.3</b> | <b>86.0</b> | <b>106.3</b> | <b>137.2</b> |

Source: ABLE Analysis



## FOREWORD



### Dr. Jitendra Singh

Union Minister of State (Independent Charge), Science & Technology, MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Government of India

**INDIA'S \$ 137 BILLION BIOECONOMY IS UNLEASHING INNOVATION, TRANSFORMING HEALTH, AND PAVING THE PATH TO 'AMRIT KAAL'"**

I am thrilled to share the good news that India's BioEconomy has experienced a remarkable surge of 29 percent, surpassing the significant milestone of \$100 billion. Our BioEconomy has reached an impressive \$137.2 billion in 2022. Each month, our BioEconomy has contributed \$11.4 billion to the national GDP. India's BioEconomy now accounts for nearly 4% of our \$4 trillion national Economy. The innovation ecosystem continues to flourish, and we aspire to become one of the top 5 Global Bio-manufacturing Hubs and among the top 10 biotechnology destinations globally.

Under the visionary leadership of Hon'ble Prime Minister Shri Narendra Modi ji, our BioEconomy has witnessed a double-digit year-on-year growth rate for the past nine years. In 2014, our BioEconomy stood at \$10 billion; today, it has grown to \$137 billion, and is expected to achieve \$300 billion by 2030.

The rise of Biotech Startups is pivotal for our future economy. These startups have experienced remarkable growth, increasing from just about 50 in 2014 to over 6,755 in 2022. I am happy to see that in 2022, a total of 1,391 biotech startups were incorporated in the country. This means on an average, every day in 2022,



four biotech startups were formed in the country.

As our industry friendly policies percolate to all sectors, biotechnology too has benefited immensely. Nearly a billion dollar was invested in the industry in the country. As the national progresses towards the “Zero carbon” state, we produced a record 443 crore litres of biofuels in 2022, enabling to reach the 10% blending target, and thus saving nearly \$ 8 billion in foreign exchange. We are confident of achieving the 20% blending target by 2030 as the industry delivers with increased production capacities using indigenous technologies and raw materials.

Biotechnology, being the technology of tomorrow, can leverage our wealth of bioresources, unique biodiversity in the Himalayas, and a vast 7,500 km-long coast line. Initiatives like Samudrayaan, exploring biodiversity beneath the seas, highlight our commitment to harnessing our bioresources. The Department of Biotechnology (DBT) supports R&D innovations and Bio-manufacturing in Advanced Biofuels and ‘Waste to Energy’ technologies, foreseeing a green and sustainable future.

Biotechnology has emerged as a trend-

ing career option among our youth, with tools like Synthetic Technology, Genome Editing, Microbial Bioresources, and Metabolic Engineering gaining increased attention.

Hon’ble Prime Minister Modi ji’s vision of Atmanirbhar Bharat has significantly influenced our vaccine strategy, exemplified by Mission Suraksha, fostering collaboration among pharma, industry, and academia. Our scientific achievements, including Chandrayaan-3 and the development of DNA vaccines, have elevated our scientific fraternity recognition to a global level. India is now acknowledged as the vaccination hub of the world.

It is time for broader synergy among all professions to achieve the “Amrit Kaal” goals over the next 25 years. Our collective efforts and advancements in the biotechnology sector underscore India’s potential as a global player in the field.

I am very happy to note the significant achievements of the national BioEconomy has been recorded in the India BioEconomy Report 2023, brought out by the Make in India cell of the DBT-Biotechnology Industry Research Assistance Council (BIRAC) in association with the Association of Biotechnology Led Enterprises (ABLE).

FROM DBT  
SECRETARY'S DESK



**Dr Rajesh Gokhale**

Secretary, Department of Biotechnology (DBT)  
and Chairman, BIRAC

**IT IS OUR VISION THAT  
INDIA'S BIOECONOMY  
REACHES \$300  
BILLION BY 2030 AND  
ACCOUNTS FOR 5-6%  
SHARE OF INDIA'S GDP.**

The journey of India's BioEconomy is indeed a fascinating tale of growth, innovation, and global impact. This year, in the dynamic landscape of India's BioEconomy, five key sectors have emerged as robust contributors, collectively generating over \$1 billion each month. These sectors, namely Diagnostics, Bioethanol, Vaccines, Biotherapeutics, and Enzymes showcase diversity and resilience, shaping India's economic narrative. These five sectors collectively underscore the multifaceted strength and economic impact of India's BioEconomy. Beyond their BioEconomic contributions, they strategically position the nation in the global biopharmaceutical and bioindustrial arenas.

The year 2022 has seen a rise in Private Equity (PE) and Venture Capital (VC) investments in the biotech industry, reaching a record-breaking \$938.8 million—a 19% growth compared to the previous year. The entrepreneurial landscape has also flourished, with 1391 new biotech startups joining the ecosystem, marking a significant chapter in innovation.

Though the concept of BioEconomy is a recent phenomenon, the world is increasingly realizing that the impact of various biotechnological tools goes far beyond just the products and services. The impact of bio-based products cuts across many segments of any economy, be it food, fuel, health care, agriculture, environmental sustainability or clothing, and many production processes utilizes green chemicals to lessen the adverse

impact on the environments.

As the word 'BioEconomy' gained attention in many large bio-based economies, the impact of biotech-based products and services has become evident. The first India BioEconomy Report (IBER) was brought out in 2016 and since then updated annual versions have been released to capture the tremendous transformation.

The Department of Biotechnology since its inception has been providing an enabling ecosystem to promote biotechnology research and improve capacity building across the country. The emphasis has been on fostering cutting edge-research and innovation, with strong emphasis on translation research. Through its various initiatives towards promoting innovative research, empowering people, building world class infrastructure and supporting public-private partnership, the Department has made a huge impact on Indian agriculture, healthcare, industry, and environment on one hand, while raising global standing of India in the sphere of biotechnology on the other.

For example, under the National BioPharma Mission, 15 vaccine candidates and 4 related technologies for various diseases are underway. Additionally, 21 Biosimilar products for diseases like Diabetes and Cancer, along with 29 Medical Devices & Diagnostics, have received support.

The government, through BIRAC, champions biotech innovation, supporting over 4,800 startups and entrepreneurs. It has established a robust biotech innovation

network with 75 bio-incubators across 21 states/UTs, supporting 1,800+ incubates. Funding initiatives like the 'Biotech Ignition Grant-in-aid, Equity Fund, SBIRI, BIPP and investment through Fund of Funds-AcE Fund further bolster biotech innovation in the country.

This year's India BioEconomy Report (IBER, 2023) has given insights revealing the brilliance of India's BioEconomy. This annual report has been prepared by the Make in India Facilitation Cell of BIRAC with research support from the Association of Biotechnology Led Enterprises (ABLE).

An attempt has been made to accurately capture some of the key economic activities that rely significantly on biotech products such as enzymes and other bio-based materials in this edition of the report. Inclusion of a big chunk of bio-based product segments in this report that was not covered in previous editions has accounted for more than \$ 40 billion in value.

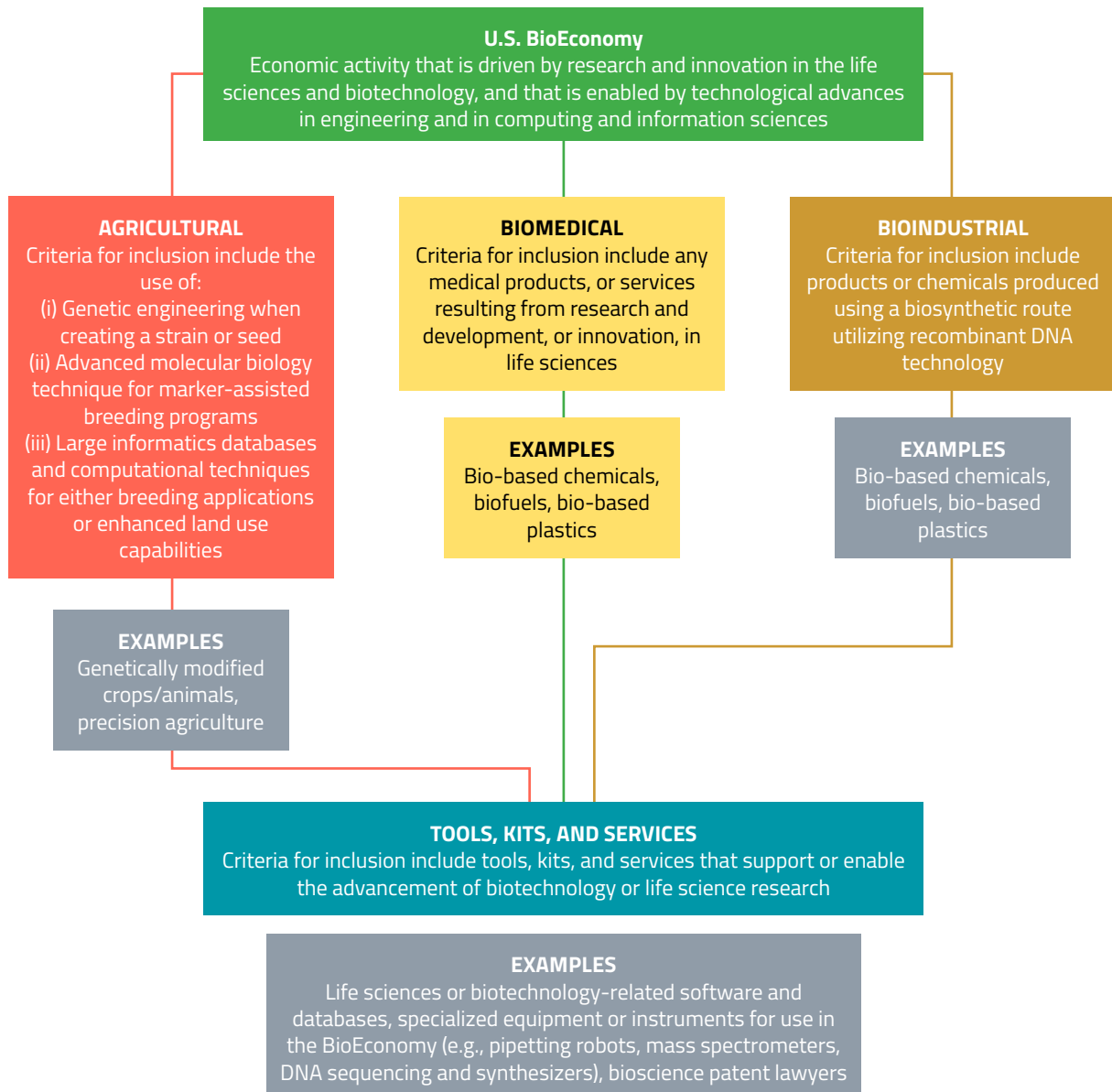
The overall BioEconomy has surged to an impressive \$137.2 billion in 2022. It is gratifying to note that the report incorporates segments such as Aqua, Poultry, Ethanol, and Food Enzymes, besides other emerging areas, to derive the figures. This alignment with BioEconomy definitions signifies a positive trend towards data harmonization. It is our vision that India's BioEconomy reaches \$300 Billion by 2030 and accounts for 5-6% share of India's GDP. I congratulate team for this timely report.

## RESEARCH METHODOLOGY

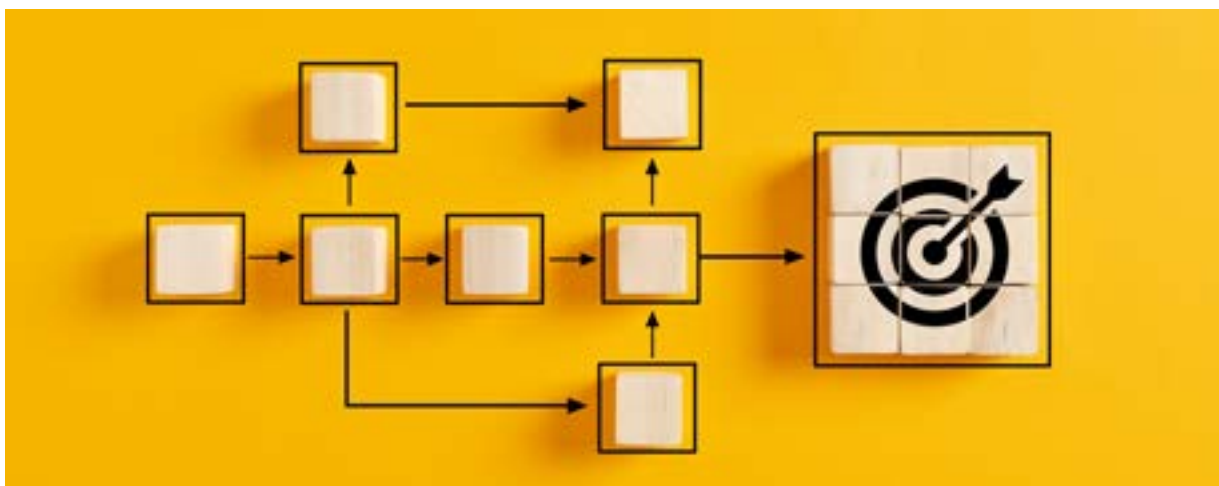
# HOW INDIA BIOECONOMY NUMBERS EMERGE

The India BioEconomy Report 2023 provides an in-depth analysis of the economic impact of biotechnological advancements across diverse sectors. The methodology employed involves the calculation of BioEconomy values for different segments, similar to the structure outlined in the US National BioEconomy Blueprint. BioEconomy numbers are derived from the total economic value created by the basic biotech product. The calculations vary for each product category.

## US BIOECONOMY DEFINITIONS



Sources: Adapted from Figure 2-2, National Academies of Sciences, Engineering, and Medicine Safeguarding the BioEconomy



## BIOECONOMY DEFINITIONS AND SCOPE VARIABILITY IN A GLOBAL CONTEXT

The term ‘BioEconomy’ lacks a standardized definition, with variations influenced by a nation’s technological capabilities, natural resources, and economic policies. Despite this variability, all definitions perceive the BioEconomy as a crosscutting force encompassing sectors such as agriculture, textiles, chemicals, energy, and pharmaceuticals.

The National Academies of Sciences, Engineering, and Medicine (NASEM), USA, identifies three visions characterizing BioEconomy definitions:

**Biotechnology Vision:** Focuses on activities centering around DNA manipulation, molecular-level production processes, commercialization, and the development of new products through biomanufacturing.

■ **Bioresource Vision:** Involves converting biomass and biological materials into power sources or new products like bioplastics and biofuels.

■ **Bioecology Vision:** Emphasizes ecological processes optimizing energy and nutrient use, promoting biodiversity, and avoiding monocultures and soil degradation.

These visions are not mutually exclusive, and a nation’s BioEconomy scope often reflects a combination of these perspectives.

### HOW OTHER COUNTRIES’ DEFINITIONS BIOECONOMY

■ **Germany:** Production, exploitation, and use of biological resources across all economic sectors.

■ **Italy:** Integration of sustainable production of renewable biological resources into value-added products like food, feed, bio-based products, and bioenergy.

■ **Japan:** Expansion of a sustainable and renewable circular economy through biotechnology and renewable biological resources.

■ **United States:** Infrastructure, innovation, products, technology, and data derived from biologically-related processes driving economic growth and societal benefits.

The U.S. lacks an officially accepted definition, with NASEM proposing a definition focused on life sciences, biotechnology, and technological advances in engineering and computing.

## BIOECONOMY DEFINITIONS IN THE INDIAN CONTEXT

India covers the main subsectors of the BioEconomy:

■ **BioPharma or BioMedical:** This subsector includes the development and production of medical products and services, such as pharmaceuticals, medical devices, and lab-grown organoids. Diagnostic reagents and tests are also included. Key areas of focus in the biomedical subsector include Cancer immunotherapy, Gene editing, Precision medicine, Regenerative medicine, Biologics, Biosimilars, etc.. The terms “BioPharma” or “BioMedical” are interchangeably used to refer to the broader category encompassing Biopharmaceuticals, Medical Devices, MedTech, and Diagnostics.

■ **BioAgri:** This subsector includes the development and production of genetically modified crops and animals, precision agriculture technologies, and bio-based products. Bt Cotton is the single largest crop.

■ **BioIndustrial:** This subsector includes the development and production of bio-based chemicals and products using enzymes, biosynthetic routes, and recombinant DNA technology. Biofuels, bio-based plastics, Biomass conversion activities, Biogas, Enzymatic applications in the alco-beverages sector, microbial enzymes in baking, dairy industry, starch industry, feed enzymes for shrimp, poultry, laundry, and washing detergent enzymes have been considered. The bio-industrial subsector is a relatively new and emerging subsector in the calculation of the BioEconomy of most countries.

■ **BioResearch & BioIT (BioServices):** Contract Research, Clinical Research and trials, Drug Discovery Services. BioIT includes life sciences or biotechnology-related software and databases, specialized equipment or instruments for

use in the BioEconomy, and bioscience patent lawyers, and services.

### MEASUREMENT OF INDIA'S BIOECONOMY

The comprehensive methodology captures the intricate value chains in each sector, showcasing the diverse contributions of biotechnology to India's economy. The calculations emphasize the evolving nature of the field and provide a foundational understanding of the BioEconomic landscape in 2023.

#### BIOAGRI AND BIOINDUSTRIAL CALCULATIONS FOR BT COTTON:

Utilizing Government of India data, the BioEconomy value of Bt cotton is calculated using three methods, with a focus on cotton textiles.

■ **Method A:** Average market price of cotton produced in the country multiplied by the average price per bale of cotton.

■ **Method B:** Based on the finished product, estimating the BioEconomy in textiles.

■ **Method C:** Considering the value of India's total textile markets.

For IBER, Method B was chosen to bifurcate the value between BioAgri and BioIndustrial segments.

#### BIOINDUSTRIAL BIOECONOMY CALCULATIONS

■ **BioFuel:** The calculated economic value of BioFuel is \$6.7 billion, encompassing biofuel, bio-plastics, and biogas. This calculation is derived from data provided by the Ministry of Consumer Affairs, Food & Public Distribution, Indian Sugar Mills Association, and Oil Marketing Companies. India's ethanol production capacity, intend-



ed for blending with petrol and other purposes, stands at approximately 947 crore liters, comprising 619 crore liters of molasses-based production capacity and 328 crore liters of grain-based production capacity. Nearly 46 percent of this capacity is allocated for blended ethanol.

■ **Potable & Industrial Alcohol** contributes \$14.52 billion to the BioEconomy. The calculation considers a total of 432 crore liters of ethanol, based on estimates of the total ethanol production capacity. The BioEconomy value is determined at 40 percent of the average price per liter

#### BIOECONOMIC VALUE OF BIOSERVICES:

The **BioServices** segment, including Contract Research Services (CRO) and BioIT, is conservatively valued by considering the revenues of the CROs and IT companies with life science practices.

#### BIOECONOMY VALUATION OF BIOPHARMA

■ **Vaccines:** The BioEconomic value of vaccines, encompassing both human and animal categories, is calculated by multiplying the overall vaccine supplies with the weighted average price per dose.

■ **Therapeutics, biosimilars, etc.:** This is measured based on the data insights of EY & IQVIA, import and export data.

■ **MedTech BioEconomy Calculations:** The MedTech BioEconomy is valued at tests and the medical devices' revenue size.

BioEconomy Calculations are also based on various reports by Economists to measure the true economic value of any product.

For example, take an SUV that a buyer gets it from, say Hyundai, for Rs 20 lakh

Of this price, the actual invoice from Hyundai will be just about Rs 10 lakh. That is the price realized by Hyundai and this further includes excise duty etc.

The balance 10 lakh is various state and central taxes, insurance, registration charges etc. So if one adds only the revenues of all automobile manufacturers and importers, it will give only half the actual picture.

Various estimates indicate that the lifetime value creation of a car bought for Rs 20 lakh will be at least 3X or Rs 60 lakh over an assumed lifetime of 10 years. The manufacturer captures only about 16.6 % of the value created by a car. Rest of it is garnered by fuel makers, accessories, local governments as taxes, insurance, tourism and other sectors benefited by the mobility given to the owner, infrastructure providers like road construction companies, toll collection agencies, and so on.

Similar attempts are made to capture the full economic value of various biotech products. It is an evolving field.







# EXECUTIVE SUMMARY

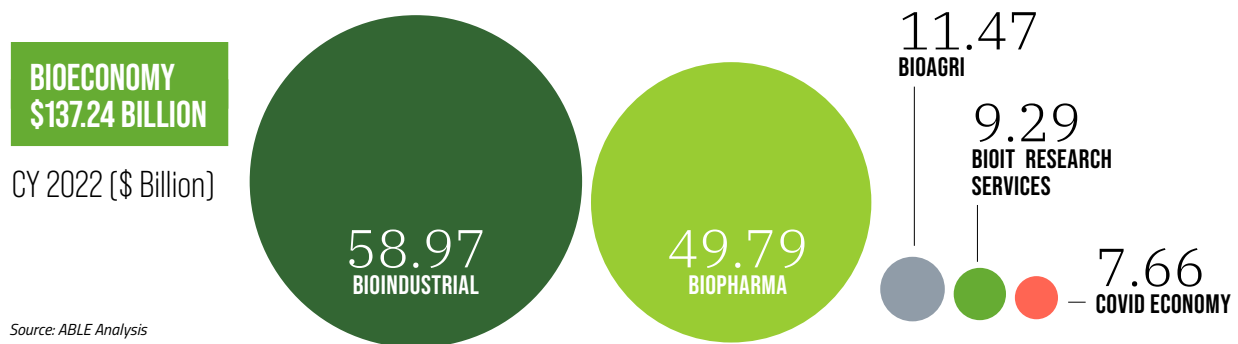


# EXECUTIVE SUMMARY

## India's BioEconomy - A Powerhouse of Innovation and Growth

India's BioEconomy experienced robust growth in 2022, surging by 29% to reach a substantial value of \$137.24 billion. This sector, encompassing economic activities derived from biological resources, played a pivotal role in India's economy, contributing 4% to the gross domestic product (GDP) and employing over 2 million people. The growth was propelled by escalating demand for bio-based products and services, supportive government initiatives, and decreasing costs in biotechnology and biomanufacturing.

## KEY HIGHLIGHTS OF INDIA'S BIOECONOMY



India's BioEconomy stands as a diverse and integrated force, with distinct segments contributing to its overall growth and impact. From the dominance of BioIndustrial and Biopharma to the expanding horizons of BioAgri and BioIT Research Services, the sector showcases resilience and adaptability, especially in the challenging times of the COVID Economy. This executive summary provides stakeholders with a comprehensive overview of the current state and future potential of the BioEconomy.

### 1. BIOINDUSTRIAL

**MARKET SIZE: \$58.97 BILLION**

**PERCENTAGE SHARE: 43%**

Dominant player with the highest market share, diverse applications including enzymes, biofuels, and industrial biotechnology. Growth driven by the Prime Minister's vision of Atmanirbhar Bharat and emphasis on energy independence by 2047.

### 2. BIOPHARMA

**MARKET SIZE: \$49.79 BILLION**

**PERCENTAGE SHARE: 36%**

Substantial contribution to the BioEconomy, biosimilar products gaining global acceptance, expected growth to nearly \$63 billion by 2025, reflecting a promising trajectory.

### 3. BIOAGRI

**MARKET SIZE: \$11.47 BILLION**

**PERCENTAGE SHARE: 8%**

Focus on agriculture, including Bt Cotton, pesticides, and other agricultural biotechnologies. Potential for significant growth with the impetus on circular economy practices in the sector.

### 4. BIOIT RESEARCH SERVICES

**MARKET SIZE: \$9.28 BILLION**

**PERCENTAGE SHARE: 7%**

Growing importance of Information Technology in the biotech sector, strong presence in CROs, CDMOs, and BioIT services. Forecasted to quadruple, reaching \$26.6 billion, reflecting the critical role of IT in biotech advancement.

### 5. COVID ECONOMY

**MARKET SIZE: \$7.66 BILLION**

**PERCENTAGE SHARE: 6%**

Reflects the impact and adaptation during the COVID-19 pandemic. Notable contributions from COVID Vaccines, testing, and related services indicate resilience and adaptability within the BioEconomy during global challenges.

### 6. TOTAL BIOECONOMY

**MARKET SIZE: \$137.24 BILLION**

**PERCENTAGE SHARE: 100%**

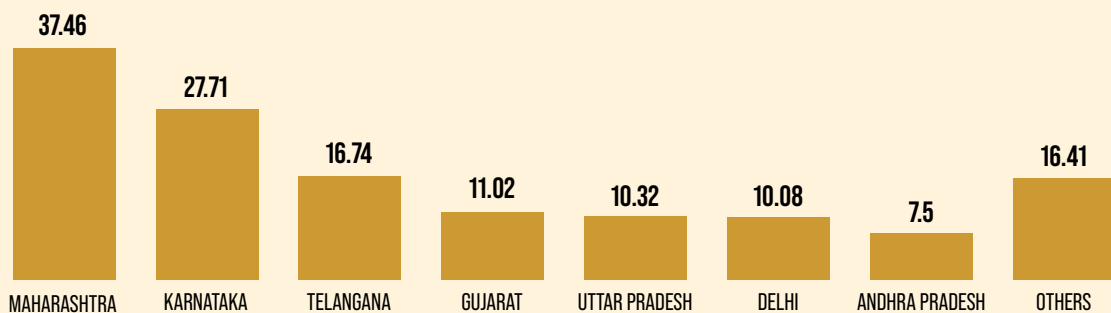
Comprehensive overview of the combined contribution of major segments, demonstrating the diverse and integrated nature of the BioEconomy.

# REGIONAL AND SECTORAL ANALYSIS OF BIOECONOMY & BIOTECH STARTUPS

## REGIONAL OVERVIEW OF INDIA'S BIOECONOMY

The BioEconomy in India thrives as a collaborative effort, with various states emerging as key contributors to the sector's growth, innovation, and sustainability. Maharashtra, Karnataka, and Telangana lead the charge, showcasing diverse strengths in biotechnology, research, pharmaceuticals, and the BioIndustrial sectors.

### TOP STATES BY ECONOMY



Source: ABLE Analysis

### LEADERS IN BIOECONOMY CONTRIBUTION BY SHARE (\$ MILLION)

#### 1. MAHARASHTRA

Share: 27% | BioEconomy Contribution: \$37.46 Billion  
A leading state with substantial contributions, emphasizing diverse bio-based sectors. Leading in both share and actual BioEconomy value.

#### 2. KARNATAKA

■ Share: 20% | BioEconomy Contribution: \$27.71 Billion  
■ Prominent in biotechnology and research, making significant contributions to the national BioEconomy.

#### 3. TELANGANA

■ Share: 12% | BioEconomy Contribution: \$16.74 Billion  
■ Notable contributions from the pharmaceutical and biotech sectors, fostering innovation.

#### 4. GUJARAT

■ Share: 8% | BioEconomy Contribution: \$11.02 Billion  
■ Strong emphasis on BioIndustrial applications and sustainable practices.

#### 5. UTTAR PRADESH

■ Share: 8% | BioEconomy Contribution: \$10.32 Billion  
■ Diversified contributions, including agriculture and healthcare, driving BioEconomy growth.

#### 6. DELHI

■ Share: 7% | BioEconomy Contribution: \$10.08 Billion  
■ Notable contributions from the research and healthcare sectors, leveraging the capital's resources.

#### 7. ANDHRA PRADESH

■ Share: 6% | BioEconomy Contribution: \$7.5 Billion  
■ Andhra Pradesh has been the anchor of aquaculture in India; generates 70% of India's BioIndustrial shrimp BioEconomy

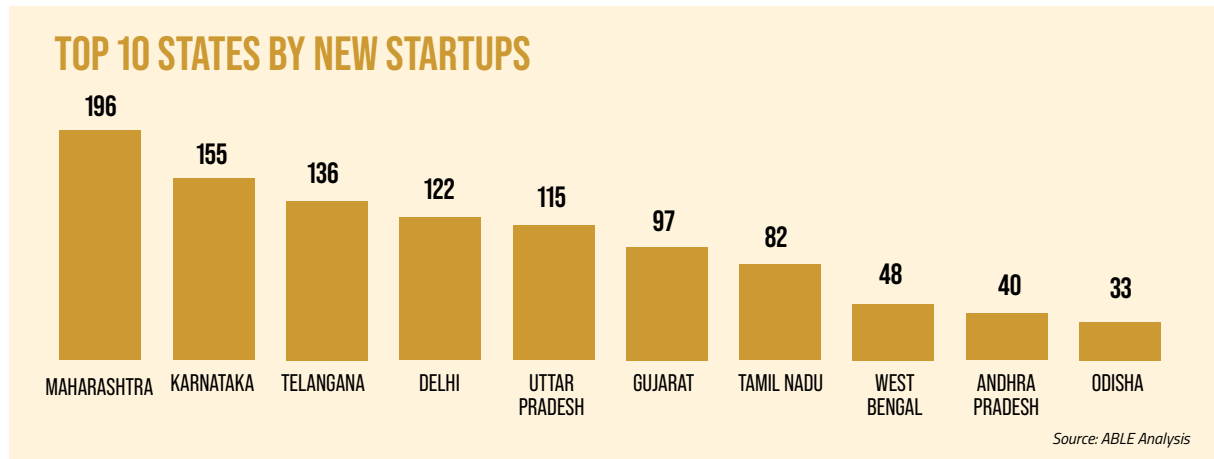
#### 8. OTHERS

■ Share: 12% | BioEconomy Contribution: \$16.41 Billion  
■ Cumulative contribution from other states, highlighting the collective strength of diverse regions.

These leading states underscore the collaborative nature of India's BioEconomy, each bringing unique strengths to the table. The distributed contributions from Maharashtra's diverse sectors, Karnataka's prowess in biotechnology, and Telangana's innovation in pharmaceuticals collectively shape the dynamic landscape of the national BioEconomy. The comprehensive overview serves as a guide for stakeholders, showcasing the significant regional players and their distinct contributions to India's flourishing BioEconomy.

## TOP 10 STATES FOR NEW STARTUPS (2022)

The entrepreneurial landscape in India witnessed dynamic growth in 2022, with startups emerging as key drivers of economic development. Maharashtra, Karnataka, and Telangana led the way, showcasing substantial growth rates and significant shares in the overall startup ecosystem. This overview highlights the vibrant and multifaceted nature of the startup ecosystem across various states.



### LEADERS IN STARTUP REGISTRATIONS (2022)

#### 1. MAHARASHTRA (196 STARTUPS):

- Remarkable 35% growth from the previous year.
- Substantial 14% share in the overall startup count.

#### 2. KARNATAKA (155 STARTUPS):

- Impressive 63% growth rate from 2021.
- Significant 11% share in the total startup count.

#### 3. TELANGANA (136 STARTUPS):

- Commendable 36% growth rate.
- Contribution of 10% to the total startup landscape.

#### 4. DELHI (122 STARTUPS):

- 36% growth rate.
- Held a 9% share in the overall startup count.

#### 5. UTTAR PRADESH (115 STARTUPS):

- Marked a growth rate of 24%.
- Contributed 8% to the total startup ecosystem.

#### 6. GUJARAT (97 STARTUPS):

- 29% growth rate.
- Contributed 7% to the total startup count.

#### 7. TAMIL NADU (82 STARTUPS):

- 26% growth rate.
- Held a 6% share in the overall startup landscape.

#### 8. WEST BENGAL (48 STARTUPS):

- 20% growth rate.
- Contributed 3% to the overall startup ecosystem.

#### 9. ANDHRA PRADESH (40 STARTUPS):

- 33% growth rate.
- Held a 3% share in the total startup count.

#### 10. ODISHA (33 STARTUPS):

- 32% growth rate.
- Held a 2% share in the total startup count.

The “Others” category, encompassing various states, contributed 26% to the overall startup count. In 2022, a total of 1391 startups were registered, reflecting a substantial 23% growth from the previous year’s count of 1128. This overview provides valuable insights into the diverse and expanding startup ecosystem, emphasizing the prominent role of specific states in driving entrepreneurial growth.

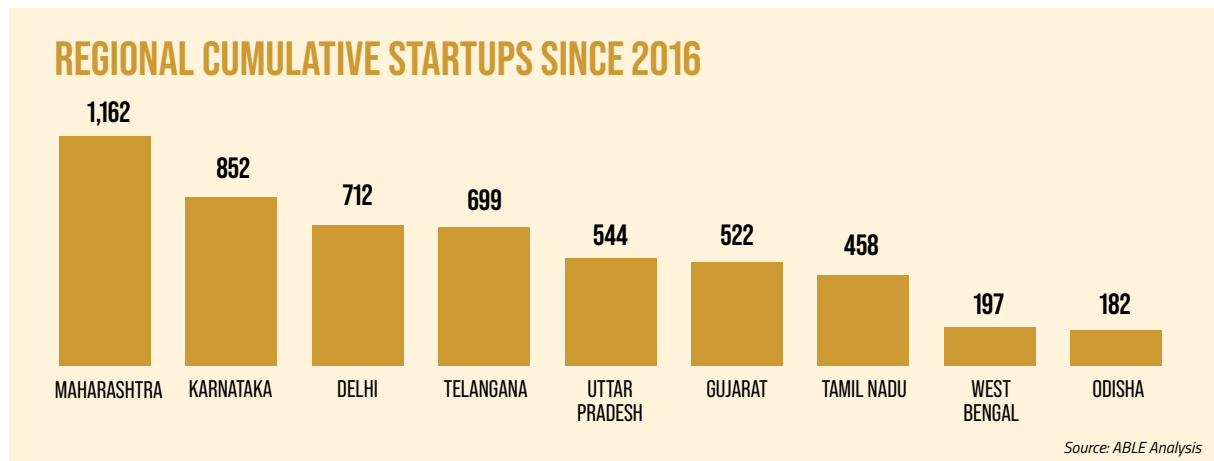
## CUMULATIVE BASE OF STARTUPS SINCE 2016

### REGIONAL BASE OF CUMULATIVE STARTUPS:

The landscape of biotech startups in India is undergoing dynamic growth, as highlighted by the regional and sectoral analysis of 2022. Maharashtra, Karnataka, and Telangana emerged as leaders in fostering biotech innovation, showcasing impressive growth rates and cumulative bases. This analysis provides a comprehensive overview of the regional distribution and sets the stage for understanding implications and trends in the biotech startup ecosystem.

### IMPLICATIONS AND TRENDS:

Understanding the sustainability and scalability of startups is crucial for shaping future policies in the biotech sector. The positive sentiment, coupled with government support and stakeholder participation, foresees the industry having nearly 31,000 startups between 2021 and 2023. This analysis lays the groundwork for strategic planning and collaborative efforts to further enhance the thriving biotech startup ecosystem.



### REGIONAL DISTRIBUTION OF BIOTECH STARTUPS

#### 1. MAHARASHTRA (1162 STARTUPS):

- Leading with a cumulative base of 1162 biotech startups, experiencing a commendable growth of 20%.

#### 2. KARNATAKA (852 STARTUPS):

- Exhibiting a significant increase, reaching a cumulative base of 852 startups, reflecting a growth rate of 22%.

#### 3. TELANGANA (699 STARTUPS):

- Showcasing robust growth with 699 biotech startups, indicating a growth rate of 24%.

#### 4. DELHI (712 STARTUPS):

- Maintaining its prominence with 712 biotech startups, showing a growth rate of 21%.

#### 5. UTTAR PRADESH (544 STARTUPS):

- Experiencing rapid growth, reaching 544 biotech startups, and a growth rate of 27%.

#### 6. GUJARAT (522 STARTUPS):

- Contributing to the overall expansion with a cumulative base of 522 startups, growing by 23%.

#### 7. TAMIL NADU (458 STARTUPS):

- Continuing to be a key player, reaching 458 biotech startups with a growth rate of 22%.

#### 8. WEST BENGAL (197 STARTUPS):

- Demonstrating exceptional growth, reaching 197 biotech startups, with a growth rate of 32%.

#### 9. ODISHA (182 STARTUPS):

- Contributing to the diversity with 182 biotech startups, growing by 22%.

#### 10. OTHERS (1427 STARTUPS):

- Other regions collectively contributing significantly, showcasing a remarkable growth rate of 42%.



## BIOTECH INVESTMENT LANDSCAPE AND FUNDING TRENDS

### OVERVIEW

The analysis of the Indian biotech investment landscape from 2013 to 2022 reveals a dynamic journey characterized by fluctuations in deal counts, investment amounts, and substantial percentage changes. Notably, the years 2021 and 2022 emerged as pivotal periods marked by heightened activity and significant deal-making in the life sciences sector.

### DEAL AMOUNT PEAKS

The highest deal amounts in the life sciences sector were recorded in 2021 and 2022. In 2015, 36 deals marked the peak, and in 2022, 31 deals showcased substantial transactional activity, underlining these years as key periods for the sector.

### INVESTMENT PEAKS

The years 2021 and 2022 stood out for substantial investment amounts. In 2022, the total deal amount reached \$938.77 million, a historic high, following 2021's total deal amount of \$789.94 million.

### PEVC INVESTMENTS TRENDS (2021-2022):

In 2022, PEVC investments in the life sciences sector witnessed a 5% growth, building on the substantial 15% year-on-year increase in 2021. The dominance of pharmaceuticals declined from 87% in 2020 to 45% in 2022, reflecting evolving trends.

### FUNDING ROUND SIZE AND TRENDS:

The average funding round size increased over the years, notably with Series C rounds receiving an average funding of \$47.1 million in 2022. Series B rounds

remained the most common type, indicating growing capital demand.

### INVESTOR CONFIDENCE AND GROWING DEMAND:

Increasing average funding round size and valuation reflect heightened investor confidence in Indian biotech companies. The growing number of funding rounds signifies increasing demand for capital, while decreasing time between rounds suggests quicker fundraising, potentially accelerating company growth.

### STRATEGIC INSIGHTS AND FUTURE LANDSCAPE:

The trends observed emphasize a rapidly changing funding landscape for early-stage biotech companies in India. Successful companies are those capable of raising significant capital, executing business plans, and demonstrating a clear path to market. Investor selectivity underscores the importance of a strong product or service offering.

This comprehensive analysis provides a valuable understanding of the trends, peaks, and shifts within the Indian biotech investment landscape, offering strategic insights for stakeholders in navigating the evolving market dynamics.

## PE INVESTMENTS BY STATE (2013-2022)

### OVERVIEW:

The comprehensive analysis of biotech investments in India spanning from 2013 to 2022 illuminates key trends, regional dominance, and the significant contributions of states to the evolving biotech landscape. The South and West regions emerge as strongholds, commanding a combined 73% share of the total biotech investment, amounting to \$4.87 billion.

### REGIONAL CUMULATIVE STARTUPS SINCE 2016



Source: ABLE Analysis

### REGIONAL BREAKDOWN

#### 1. SOUTH (46%)

Led by Karnataka and Telangana, the Southern states dominate with a substantial 46% share, showcasing diverse biotech hubs and a proactive investment climate.

#### 2. WEST (29%)

Gujarat and Maharashtra jointly contribute 29%, underscoring the region's significance in fostering biotech innovation.

#### 3. NORTH (17%)

The northern states, including Delhi, Haryana, and Uttar Pradesh, collectively contribute 17%, showcasing a noteworthy presence in the evolving biotech sector.

#### 4. OTHERS (8%)

States beyond major regions contribute 8%, highlighting emerging players and unique biotech narratives outside primary focus areas

## TOP STATES

Karnataka consistently emerges as a leader across all three data tables, commanding a substantial share in biotech investments (30%), having a significant cumulative base of biotech startups (852), and making a substantial contribution to the BioEconomy (20% share).

Maharashtra, fueled by the Mumbai-Pune biotech axis, is a consistent player, boasting a considerable share in both biotech invest-

ments (13%) and a leading cumulative base of biotech startups (1162). Moreover, Maharashtra holds a leading position in BioEconomy contributions (\$37.46 Billion).

Gujarat stands out with a significant share in biotech investments (14%) and contributing substantially to the BioEconomy (\$11.02 Billion). The state's proactive approach is evident in shaping the nation's biotech future.

## UNICORN STATUS

In a groundbreaking achievement, Molbio Diagnostics achieved unicorn status following a remarkable funding round led by Temasek, which raised an impressive \$85 million. This significant investment catapulted the company's valuation to a staggering \$1.53

billion, showcasing an 8X increase from its previous valuation of \$182.7 million. This milestone positioned Molbio Diagnostics as the second unicorn to emerge from India in September 2022 after Tata1MG.

## DRIVING FORCES AND FUTURE LANDSCAPE OF INDIA'S BIOECONOMY

### BIOECONOMY DYNAMICS:

The growth of India's BioEconomy is propelled by an increasing demand for bio-based products and services. These encompass a wide range of items, from biofuels and bioplastics to biopharmaceuticals, all derived from biological resources. India's preference for bio-based products is rooted in their sustainability, offering environmental benefits such as renewable energy sources and sustainable alternatives to traditional plastics.

### GOVERNMENT SUPPORT AND INITIATIVES:

India's BioEconomy is bolstered by the government's proactive measures. Various initiatives support research and development in the sector, coupled with financial incentives for companies engaged in commercializing bio-based products. This strategic approach addresses the rising demand for biofuels, renewable energy, and affordable healthcare, aligning with India's commitment to a sustainable and bio-centric future.

### TECHNOLOGICAL ADVANCEMENTS:

The declining costs of biotechnology and biomanufacturing play a pivotal role in expanding the BioEconomy. These technologies, essential for producing bio-based products and services, are becoming more economically accessible, making sustainability a feasible and affordable choice.

### STRATEGIC INSIGHTS AND FUTURE OUTLOOK:

The dynamic growth observed in the biotechnology sector positions it as a key player in India's economic landscape. Strategic insights reveal the resilience of the industry, with Biopharma, Therapeutics, and BioIndustrial leading the way. The future outlook is shaped by key drivers, including global acceptance of biosimilars, ongoing innovation in therapeutics, sustainable practices in BioIndustrial, and the integration of technology in BioIT Research Services.

### CHALLENGES AND MITIGATION STRATEGIES:

While the BioEconomy presents immense opportunities, it is not without challenges. Pandemic-related volatility, as seen in the Vaccines and Diagnostics sub-segments, underscores the need for flexible strategies and continued investment in research and development for rapid response capabilities. Additionally, strong regulatory support and infrastructure development are essential for capitalizing on emerging opportunities, emphasizing the importance of collaboration between the government and industry stakeholders.

India's BioEconomy stands at the intersection of sustainability, innovation, and economic growth. With a robust foundation and strategic foresight, it is poised to address global challenges, contribute to job creation, and play a pivotal role in shaping a bio-centric future.







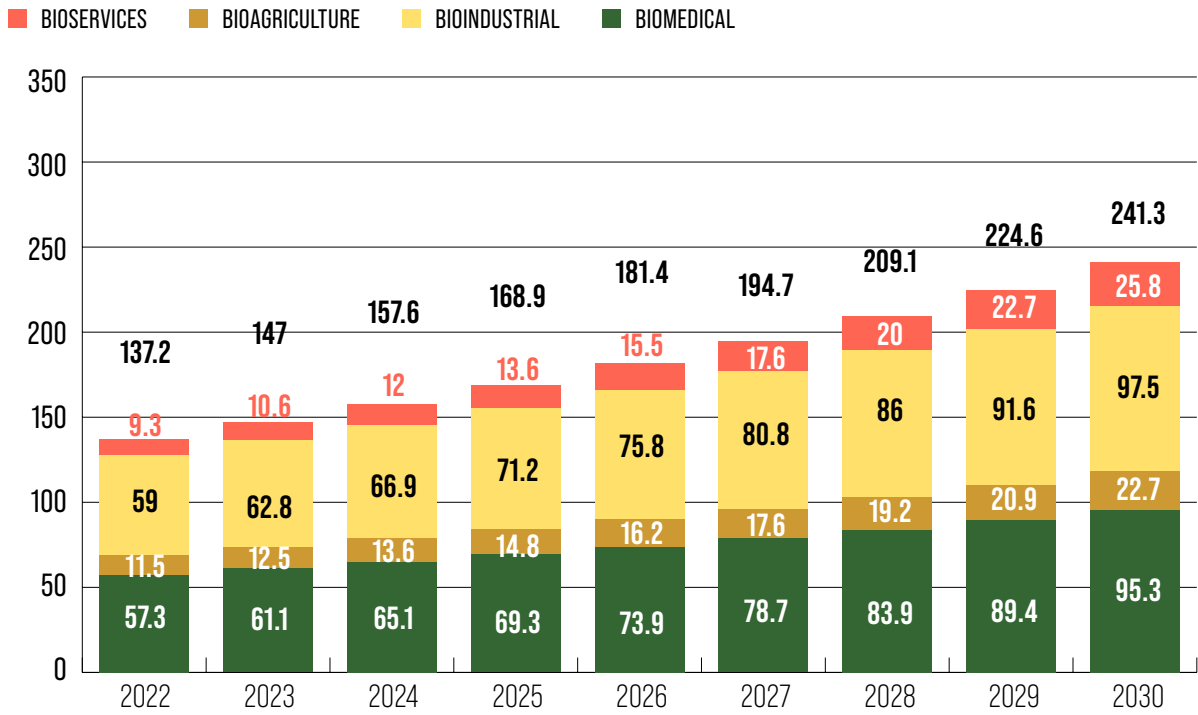
*Association of Biotechnology Led Enterprises*



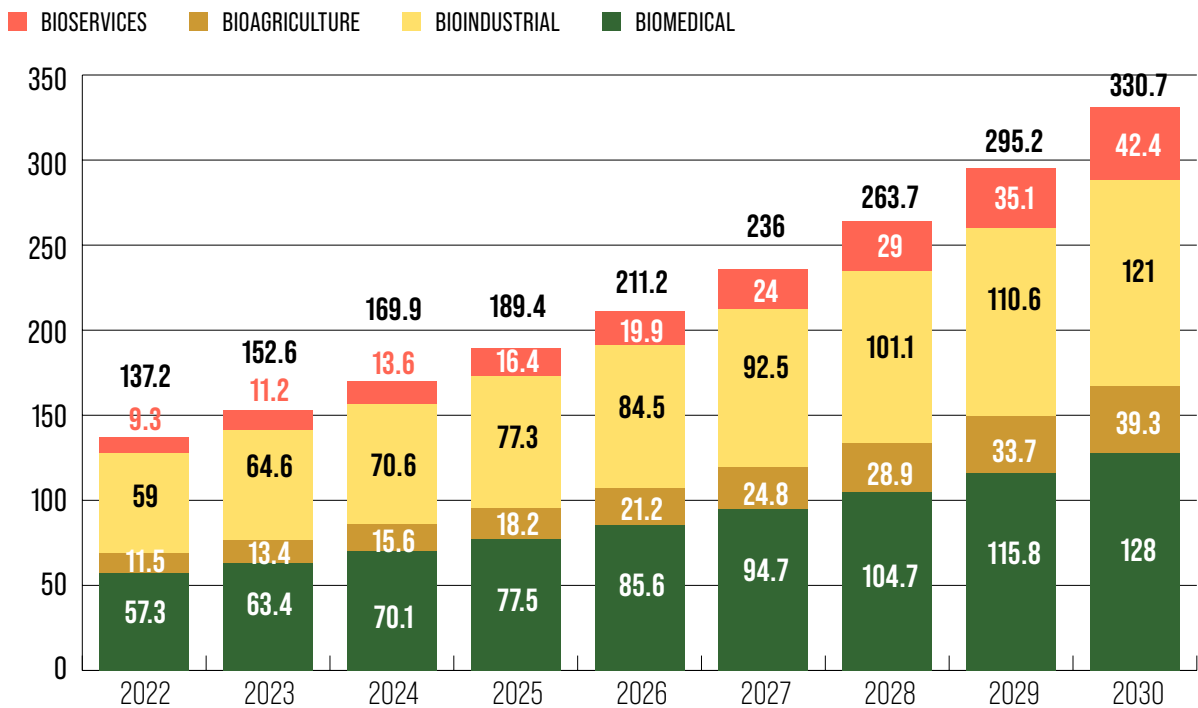
# PROJECTIONS



**BIOECONOMY PROJECTIONS FOR 2022-2023 (\$ BILLION) | CONSERVATIVE ESTIMATE**



**BIOECONOMY PROJECTIONS FOR 2022-2023 (\$ BILLION) | OPTIMISTIC ESTIMATE**



**NOTES ON SEGMENTS**

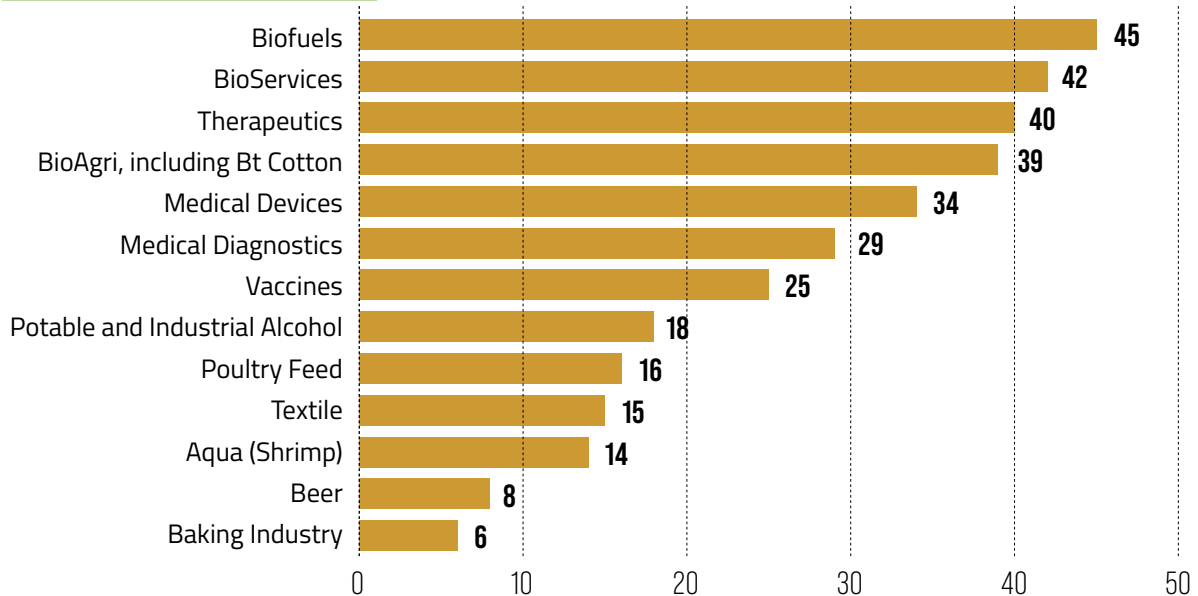
- BioMedical: Biopharmaceuticals, diagnostics, medical devices
- BioAgriculture: Bt Crops, Animal biotech, Biomass, Pesticides, Fertilizers
- BioIndustrial: Aqua - Shrimp industry, Food and Beverage industry, Industrial sector, Laundry and Cleaning industry, Paper and Pulp, Poultry Industry, Textile Industry, Vegetable Oils industry
- BioServices: BioIT, Platforms, Contract Research, Drug Discovery, Patent Services, etc.



## ANALYSIS OF KEY SEGMENTS IN THE BIOECONOMY FOR THE YEAR 2030

The BioEconomy in India is forecasted to exhibit conservative growth, reaching \$241.3 billion by 2030, with optimistic projections indicating a potential expansion to \$330.7 billion, reflecting a Compound Annual Growth Rate (CAGR) of 12%.

### YEAR 2030 | KEY SEGMENTS



Source: ABLE Analysis

### KEY SECTOR TRENDS:

#### BIOMEDICAL:

The BioMedical sector is poised for consistent growth, with the potential to increase from \$57.3 billion in 2022 to an estimated \$128 billion by 2030. This trend underscores the sector's resilience and evolving market demand for medical innovations and healthcare solutions.

#### BIOAGRICULTURE:

BioAgriculture exhibits a steady upward trajectory, growing from \$11.5 billion to an anticipated \$39.3 billion by 2030. Sustained growth reflects the increasing importance of Bt cotton and the need for sustainable and innovative farming practices.

#### BIOINDUSTRIAL:

The BioIndustrial sector follows a similar growth pattern, projecting an increase from \$59 billion to \$121 billion by 2030. This

substantial growth underscores the sector's pivotal role in fostering sustainable industrial processes, including biofuels and industrial enzymes.

#### BIO SERVICES:

BioServices are poised for significant growth, expanding from \$9.3 billion to a projected \$42.4 billion by 2030. This sector's notable upward trajectory emphasizes the rising demand for bio-related services, spanning research, testing, and other essential services within the BioEconomy.

### IDENTIFYING KEY TRENDS:

#### \$100 BILLION SEGMENTS:

Transitioning to the identification of key trends, we observe that both the BioMedical and BioIndustrial sectors are on track to surpass the \$100 billion mark, signifying their crucial roles in the overall growth of the BioEconomy.

The BioEconomy's trajectory in India is marked by promising growth across key sectors, with the projected \$100 billion milestones in BioMedical and BioIndustrial segments signaling pivotal advancements. This positions India as a key player in the global BioEconomy landscape.

The diversity of key segments underscores the comprehensive impact of the BioEconomy across various industries. From energy solutions (Biofuels) to healthcare innovations (Therapeutics, Medical Devices, Vaccines) and agricultural advancements (BioAgri), the BioEconomy plays a vital role in shaping sustainable and innovative practices across multiple sectors. These projections for the year 2030 suggest a robust and interconnected BioEconomy landscape with significant economic and environmental implications.

#### SEGMENTATION BY ECONOMIC CONTRIBUTION: \$40-45 BILLION CLUB:

- Biofuels (45.0 Billion)
- BioServices (42.4 Billion)
- Therapeutics (40.0 Billion)

#### \$30-40 BILLION CLUB:

- BioAgri, including Bt Cotton (39.0 Billion)
- Medical Devices (34.2 Billion)

#### \$20-30 BILLION CLUB:

- Medical Diagnostics (28.7 Billion)
- Vaccines (25.1 Billion)

#### \$10-20 BILLION CLUB:

- Potable and Industrial Alcohol (18.2 Billion)
- Poultry Feed (15.5 Billion)
- Textile (14.6 Billion)
- Aqua (Shrimp Billion) (14.0 Billion)

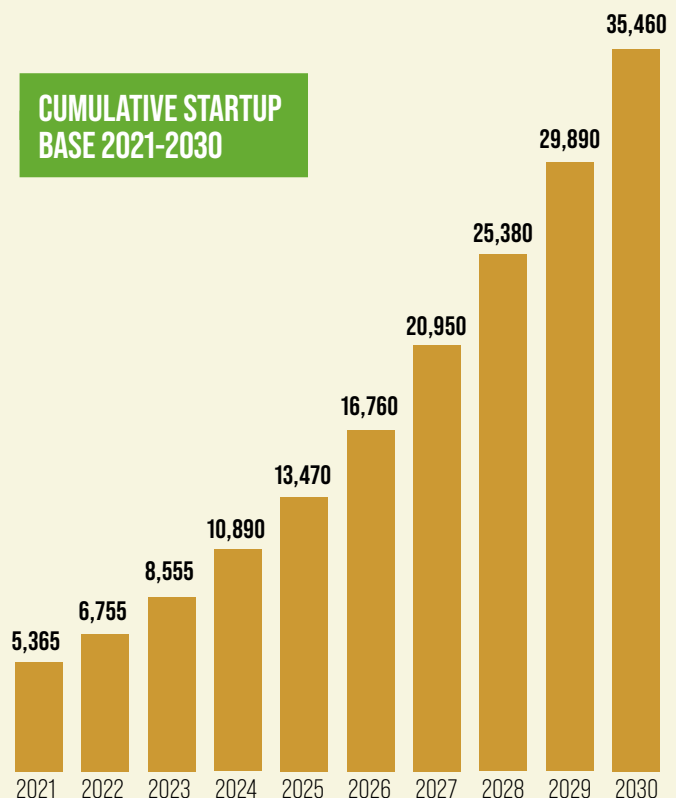
#### < \$10 BILLION:

- Beer (8.1 Billion)
- Baking Industry (5.9 Billion)

## 35000 CUMULATIVE STARTUPS PROJECTED FOR 2030 UNVEILING GROWTH TRENDS

The cumulative base of startups and growth trends in startups unveil a dynamic and flourishing entrepreneurial landscape, with the cumulative base expected to reach 35,460 by 2030. Notably, the years 2024 and 2027 emerge as potential inflection points, symbolizing key milestones in the industry's trajectory. It is anticipated that the cumulative base will surpass the 10,000 mark in 2024, with an even more significant milestone of 20,000 expected in 2027.

This cumulative base of startups functions as a crucial metric for evaluating the vibrancy and competitiveness of the entrepreneurial ecosystem. The calculated Compound Annual Growth Rate (CAGR) for the cumulative base of startups from 2021 to 2030 is approximately 31.1%. This CAGR underscores the robust and sustained growth of the startup ecosystem, highlighting its resilience and attractiveness to entrepreneurs and investors alike.



Source: ABLE Analysis



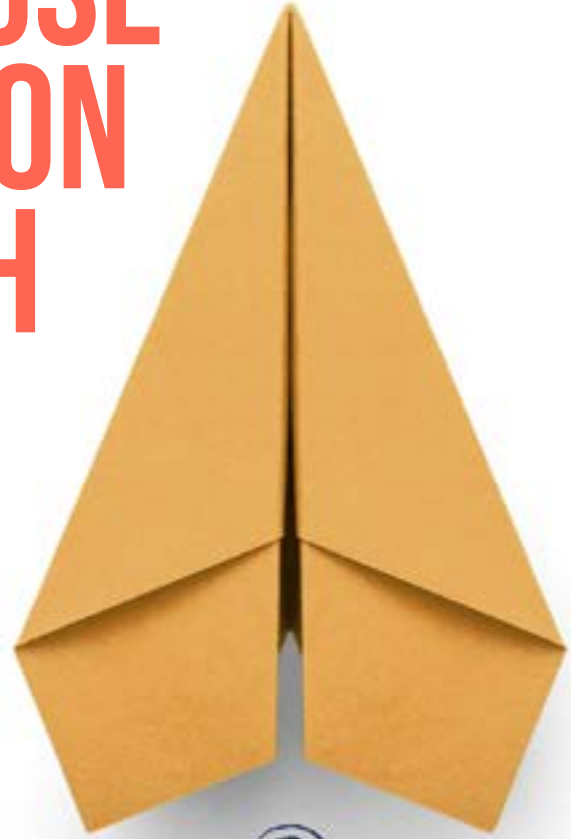


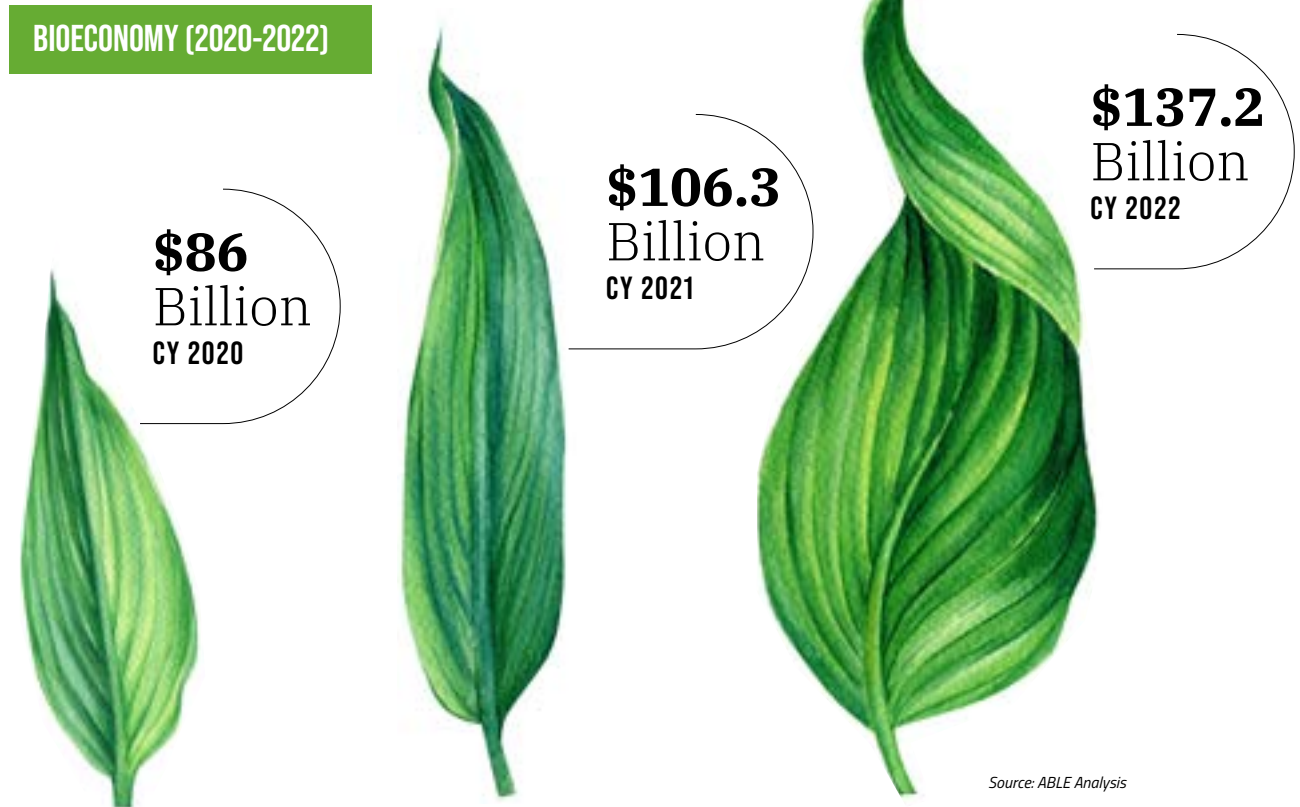
# OVERVIEW

## INDIA'S BIOECONOMY

# A POWERHOUSE OF INNOVATION AND GROWTH

India's BioEconomy Booms,  
Registers 29% Growth in 2022,  
Valued at \$137.24 Billion





India's BioEconomy, which encompasses all economic activities derived from biological resources, grew by 29% in 2022, reaching a value of \$137.24 billion. Several factors fueled this growth, including increasing demand for bio-based products and services, government support for the BioEconomy, and declining biotechnology and biomanufacturing costs.

India's BioEconomy is a significant contributor to the country's economy. In 2022, it accounted for 4% of India's gross domestic product (GDP) of \$3.47 trillion. The BioEconomy employs over 2 million people in India and is expected to grow further in the coming years.

A key driver of India BioEconomy's growth is the surging demand for bio-based products and services. Bio-based products are products that are made from biological resources, such as plants, animals, and microbes. Bio-based services are services that use biological resources

to produce products or deliver services.

India's growing preference for bio-based products stems from their sustainability and environmental benefits. For example, biofuels are a renewable source of energy that can help to reduce India's reliance on fossil fuels. Bioplastics are a sustainable alternative to traditional plastics. Biopharmaceuticals are drugs and vaccines that are produced using biotechnology.

The Indian government is also supporting the growth of the BioEconomy. The government has launched several initiatives to support research and development in the BioEconomy. The government has also provided financial incentives for companies to commercialize bio-based products and services and address the needs of increasing demand for biofuels, renewable energy, affordable healthcare.

The declining costs of biotechnology and biomanufacturing are contributing to

drive the growth of India's BioEconomy. Biotechnology and biomanufacturing are the key technologies that are used to produce bio-based products and services. The declining costs of these technologies are making bio-based products and services more affordable.

India's rapidly growing BioEconomy holds immense potential for job creation, economic growth, and addressing global challenges. This change emphasizes the strength of India's BioEconomy and its potential to address global challenges.

### STRATEGIC INSIGHTS AND FUTURE OUTLOOK

The trends observed in the biotechnology sector lay the foundation for strategic insights and future planning. The sector's dynamic nature, as evident in the growth of Biopharma, Therapeutics, Bio-Industrial, and steady contributions from other sub-segments, underscores the resilience and adaptability of the Indian biotechnology industry.

#### KEY DRIVERS FOR FUTURE GROWTH

**Global Acceptance of Biosimilars:** The global acceptance of India-made biosimilars presents an opportunity for the Biopharma sector to further expand its market share in developed economies.

**Innovation in Therapeutics:** Continued innovation in therapeutic solutions, including the development of BioPharmaceuticals, personalized medicine, and precision treatments, is likely to drive the growth of the Therapeutics sub-segment.

#### **Sustainable Practices in BioIndustrial:**

The focus on sustainable industrial practices, including increased biofuel production and the application of enzymes, aligns with global trends towards environmental consciousness, providing a significant growth avenue for the BioIndustrial sub-segment.

#### **Technology Integration in Bio-ITResearch Services:**

The integration of technology in biotechnology research services is expected to accelerate, driven by advancements in areas like bioinformatics, data analytics, and artificial intelligence. This integration will enhance research capabilities and contribute to the growth of the BioITResearch Services sub-segment.

#### CHALLENGES AND MITIGATION STRATEGIES:

**Pandemic-Related Volatility:** The sector's sensitivity to global health crises, as seen in the Vaccines and Diagnostics sub-segments, highlights the need for flexible strategies that can adapt to unforeseen challenges. Continued investment in research and development for rapid response capabilities is crucial.

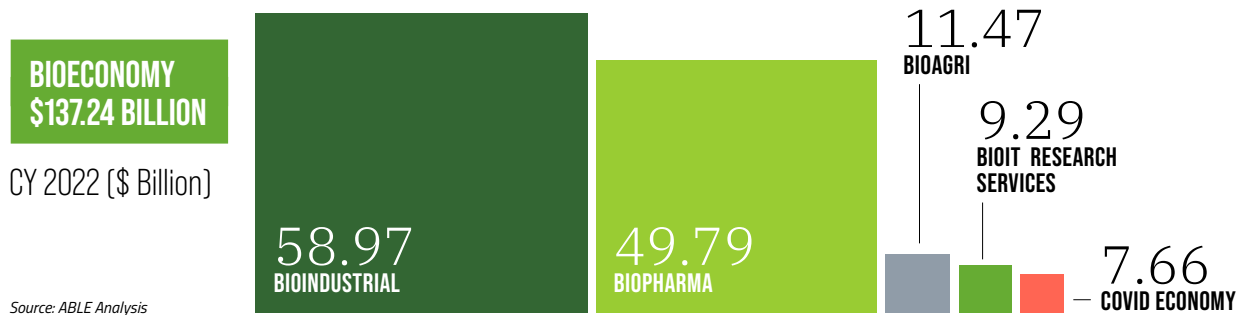
#### **Regulatory and Infrastructure Support:**

To capitalize on emerging opportunities, especially in areas like smart proteins and fermentation capacities, the industry requires strong regulatory support and infrastructure development. Collaboration between the government and industry stakeholders will be essential in fostering growth.



## KEY HIGHLIGHTS OF INDIA'S BIOECONOMY

The BioEconomy's major segments play distinct yet interconnected roles, contributing to the sector's overall growth and impact. The dominance of BioIndustrial and Biopharma highlights the significance of industrial applications and pharmaceutical advancements. BioAgri and BioIT Research Services showcase the expanding horizons of sustainable agriculture and information technology in biotechnology. The COVID Economy segment underlines the sector's resilience during challenging times. The comprehensive overview provides stakeholders with valuable insights into the current state and future potential of the BioEconomy.



### 1. BIOINDUSTRIAL:

- Market Size: \$58.97 billion
- Percentage Share: 43%

#### Key Highlights

- Dominant player with the highest market share.
- Diverse applications, including enzymes, biofuels, and industrial biotechnology.
- Growth driven by the Prime Minister's vision of Atmanirbhar Bharat and emphasis on energy independence by 2047.

### 2. BIOPHARMA:

- Market Size: \$49.79 billion
- Percentage Share: 36%

#### Key Highlights

- Substantial contribution to the BioEconomy, emphasizing pharmaceuticals and biotechnological innovations.
- Biosimilar products gaining acceptance in global markets, contributing to growth.
- Expected growth to nearly \$63 billion by 2025, reflecting a promising trajectory.

### 3. BIOAGRI:

- Market Size: \$11.47 billion
- Percentage Share: 8%

#### Key Highlights

- Focus on agriculture, including Bt Cotton, pesticides, and other agricultural biotechnologies.
- Potential for significant growth with the impetus on circular economy practices in the sector.

### 4. BIOIT RESEARCH SERVICES:

- Market Size: \$9.28 billion
- Percentage Share: 7%

#### Key Highlights

- Growing importance of Information Technology in the biotech sector.
- Strong presence in Contract Research Organizations (CROs), Contract Development and Manufacturing Organizations (CDMOs), and BioIT services.
- Forecasted to quadruple, reaching \$26.6 billion, reflecting the critical role of IT in biotech advancement.

**5. COVID ECONOMY:**

- Market Size: \$7.66 billion
- Percentage Share: 6%

**Key Highlights**

- Reflects the impact and adaptation during the COVID-19 pandemic.
- Notable contributions from COVID Vaccines, testing, and related services.
- Indicates resilience and adaptability within the BioEconomy during global

challenges.

**6. TOTAL BIOECONOMY:**

- Market Size: \$137.2 billion
- Percentage Share: 100%

**Key Highlights**

- Comprehensive overview of the combined contribution of major segments.
- Demonstrates the diverse and integrated nature of the BioEconomy.

**TREND ANALYSIS OF MAJOR SEGMENTS BASED ON THEIR CONTRIBUTION TO THE BIOECONOMY IN 2022**

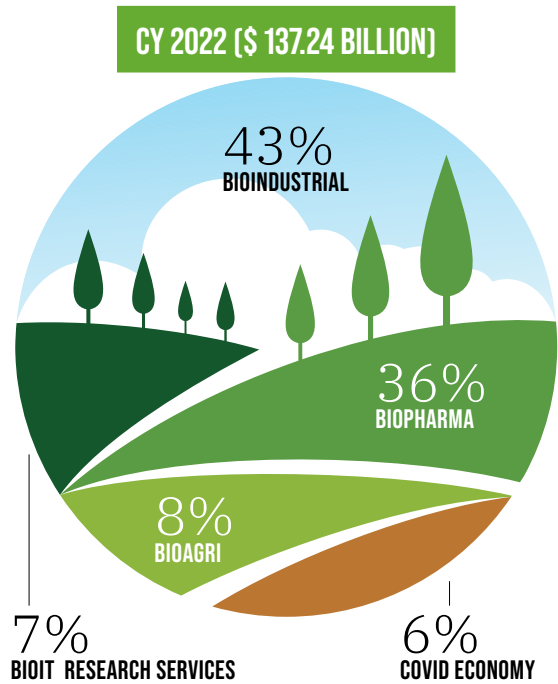
The latest data on India’s BioEconomy sub-segments for the year 2022 indicated a robust and diversified growth pattern, further solidifying the nation’s position in the global biotechnology landscape.

In 2022, the BioIndustrial segment accounted for the largest share of the total BioEconomy, at 43%. This segment includes activities such as the production of biofuels, biomaterials, biochemicals, and enzymes application.

The BioPharma segment was the second largest segment, accounting for 36% of the total BioEconomy. This segment includes activities such as the production of BioPharmaceuticals, biotherapeutics, and biodiagnostics.

The BioAgri segment was the third largest segment, accounting for 8% of the total BioEconomy. This segment includes activities such as the production of Bt Cotton, biofertilizers, biopesticides, and bio-based agricultural products.

The BIOITresearch segment accounted for 7% of the total BioEconomy. This segment includes activities such as the development of bioinformatics tools, the conduct of bio-based research, clinical research, and the provision of bio-based consulting services.



Source: ABLE Analysis

**1. BIOAGRI THRIVES WITH SUSTAINABLE PRACTICES**

**BioAgri Resilience (2020-2022):** The BioAgri sub-segment showcased resilience, maintaining consistent growth from \$11.1 billion in 2020 to \$11.47 billion in 2022. This stability was driven by advancements in biotechnology-driven agriculture, increased adoption of Bt Cotton, and a growing focus on sustainable and circular agriculture practices.

**BioAgri Sub-segments:**

- BioPesticides, Biofertilizers, BioStim-

ulants: With a notable 1% share, this sub-segment highlighted the growing importance of sustainable agricultural practices, contributing to pest management and soil health.

- **Bt Cotton:** Emerging as a dominant force with a 7.45% share, Bt Cotton reaffirmed India's prowess in biotech-enhanced crops, showcasing technological advancements and contributing significantly to the agricultural sector's economic footprint.

## 2. BIOINDUSTRIAL BOOM

**BioIndustrial Growth (2020-2022):** The BioIndustrial sub-segment, including Enzymes and Biofuels, experienced substantial growth, surging from \$20.92 billion in 2020 to an impressive \$59.04 billion in 2022. Increased emphasis on sustainable industrial practices, supported by the Indian Government's amendments to the National Policy on Biofuels, played a crucial role in driving this growth.

### BIOINDUSTRIAL INNOVATIONS:

- **Aqua (Shrimp):** The BioIndustrial sector demonstrated versatility with notable contributions in aquaculture contributing over 5.32% to the BioEconomy.
- **Biofuels:** Positioned at 4.88%, the Biofuels sub-segment highlighted India's commitment to sustainable energy solutions, aligning with the nation's focus on reducing carbon footprints.
- **Poultry Feed:** Poultry Feed accounted for 7.51% across various sectors
- **Baking Industry (Biscuits & Breads), Textile, Dishwashing Enzymes:** Contributions from Textile (5.03%), Dishwashing Enzymes (0.05%), and Baking industry (2.33%) showcased the widespread influence of BioIndustrial applications. The shift is towards greener

and more efficient industrial processes.

- **Enzymes - Alcohol, Beer, Wine Making:** The category of BioIndustrial Enzymes played a pivotal role, contributing significantly to the production of Potable & Industrial Alcohol (10.58%), Beer (3.64%), and Wine (0.12%).

## 3. BIOIT AND RESEARCH SERVICES FUEL TECHNOLOGICAL ADVANCEMENTS

**BioITResearch Services Growth (2020-2022):** The BIOITResearch Services sub-segment demonstrated steady growth, with value increasing to \$9.3 billion in 2022. Large IT companies with dedicated biotechhealthcare practices significantly contributed to this growth, aligning with the increasing integration of technology in biotechnology research and development.

**BioIT Research Services Sub-segment:** With a 6.77% share, this sub-segment reflected the increasing reliance on biotechnology for research and technological advancements. The growth signaled a synergy between biotechnology and information technology, driving innovations in healthcare and life sciences.

## 4. BIOPHARMA CONTINUES TO LEAD THE WAY

**Biopharma Growth (2020-2022):** The Biopharma sub-segment stood out as a dominant force, experiencing consistent growth from \$38 billion in 2020 to \$49.79 billion in 2022, demonstrating resilience and robustness. Factors contributing to this growth included the increasing acceptance of India-made biosimilars in developed markets.

**Vaccines Sub-segment:** The Vaccines sub-segment exhibited interesting fluctuations, experiencing a dip from \$12.5 billion in 2020 to \$8.67 billion in 2021, followed by a notable rebound to \$13.96 billion in 2022. This volatility reflected the sector's responsiveness to global health challenges, with the resurgence in

2022 aligning with intensified global vaccination campaigns.

**Therapeutics Sub-segment:** The Therapeutics sub-segment showcased steady growth, doubling its financial contribution from \$7.5 billion in 2020 to \$16.81 billion in 2022. This indicated a rising demand for therapeutic solutions and underscored advancements in biotechnological research, aligning with the increasing focus on precision medicine, personalized treatments, and innovative BioPharmaceuticals.

**Diagnostics Sub-segment:** Diagnostics witness a mixed performance, reaching a peak of \$20.4 billion in 2021, followed by a slight decrease to \$19.0 billion in 2022. This fluctuation may be attributed to the evolving landscape of diagnostic technologies and the impact of the COVID-19 pandemic. The COVID Economy sub-segment reflects the pandemic's influence, with a spike in 2021 driven by increased

testing demand and a subsequent decline in 2022 as the emphasis shifts towards recovery and post-pandemic strategies.

**Combined Contributions (Therapeutics, Diagnostics, Vaccines, Covid Testing, Covid Vaccines):** The BioPharma sector collectively contributed over 41.8%, with contributions from Therapeutics (12.24%), Diagnostics (13.86%), Vaccines (10.17%), Covid Testing (1.40%), and Covid Vaccines (4.18%). These collectively demonstrated the sector's resilience and strategic importance, particularly in the context of global health challenges.

The diverse contributions from BioAgri, BioIndustrial, BioIT, and BioPharma showcased India's prowess in harnessing biotechnology across various sectors. This data underscored not only economic growth but also the nation's commitment to sustainable and innovative practices in agriculture, industry, healthcare, and research.

## PERFORMANCE ANALYSIS OF BIOECONOMY SUB-SEGMENTS (2022)

The BioEconomy is a multifaceted sector with diverse sub-segments contributing to its growth. A detailed analysis of the performance of key sub-segments in 2022 provides valuable insights into their respective contributions and market shares.

### 1. BIOAGRI:

#### BIOPESTICIDES, BIOFERTILIZERS, BIOSTIMULANTS:

- Market Size: \$1.24 billion
- Percentage Share: 0.90%
- A niche sub-segment focusing on sustainable agricultural practices.

#### BT COTTON:

- Market Size: \$10.23 billion
- Percentage Share: 7.45%
- Substantial contribution to BioAgri, reflecting the significance of genetically modified crops.

### 2. BIOINDUSTRIAL:

#### AQUA (SHRIMP):

- Market Size: \$7.30 billion

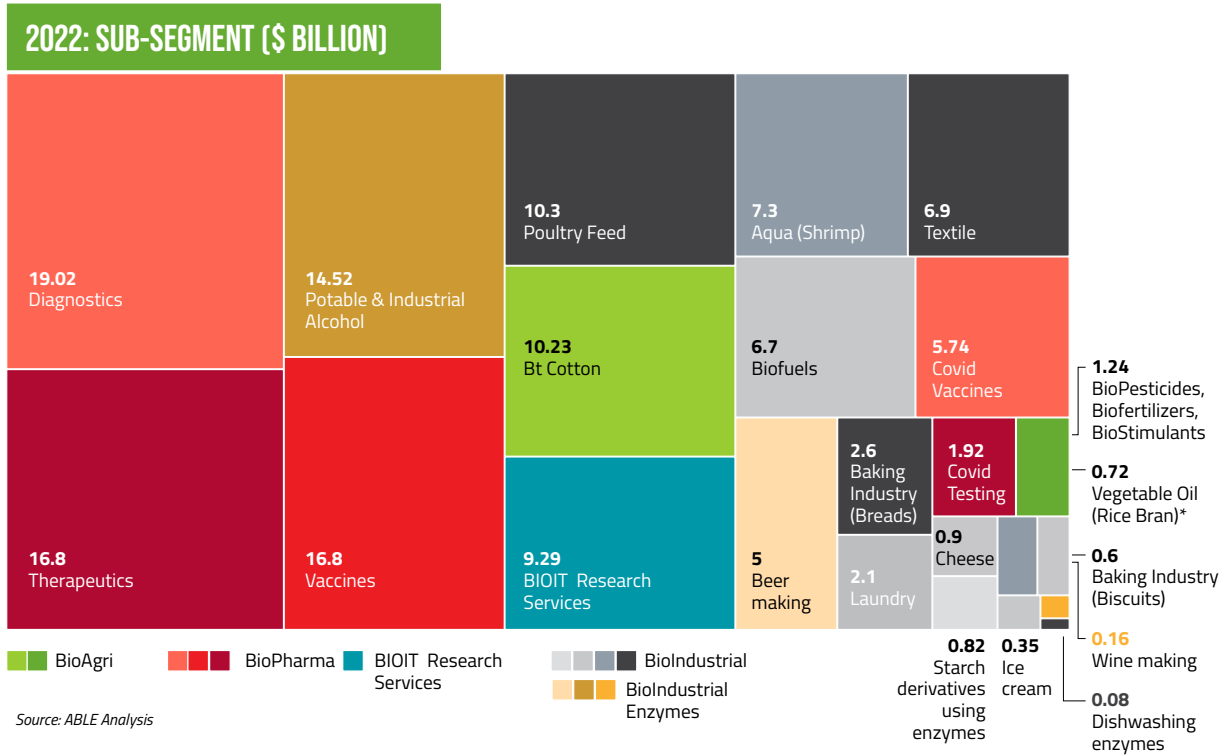
- Percentage Share: 5.32%
- Highlights the importance of BioIndustrial applications in aquaculture.

#### BAKING INDUSTRY (BISCUITS, BREADS):

- Combined Market Size: \$3.20 billion
- Percentage Share: 2.33%
- Indicates the role of BioIndustrial processes in the baking industry.

#### BIOFUELS:

- Market Size: \$6.70 billion
- Percentage Share: 4.88%
- Growth in biofuel production, aligning with sustainable energy goals.



**POULTRY FEED:**

- Market Size: \$10.30 billion
- Percentage Share: 7.51%
- Significant contribution to the BioIndustrial sector, emphasizing animal biotechnology.

**TEXTILE:**

- Market Size: \$6.90 billion
- Percentage Share: 5.03%
- Highlights the application of biotechnology in the textile industry.

**ENZYMES (VARIOUS APPLICATIONS):**

- Combined Market Size: \$20.76 billion
- Percentage Share: 15.15%
- Diverse applications in potable and industrial alcohol, beer making, wine making, and more.

**3. BIOIT RESEARCH SERVICES:**

**RESEARCH SERVICES:**

- Market Size: \$9.29 billion
- Percentage Share: 6.77%
- Growing importance of Information Technology in BioIndustrial advancements.

**4. BIOPHARMA:**

**Therapeutics, Diagnostics, Vaccines:**

- Combined Market Size: \$49.78 billion
- Percentage Share: 36.27% - Dominant segment within BioEconomy, emphasizing pharmaceutical and diagnostic innovations.

**Covid Testing and Vaccines:**

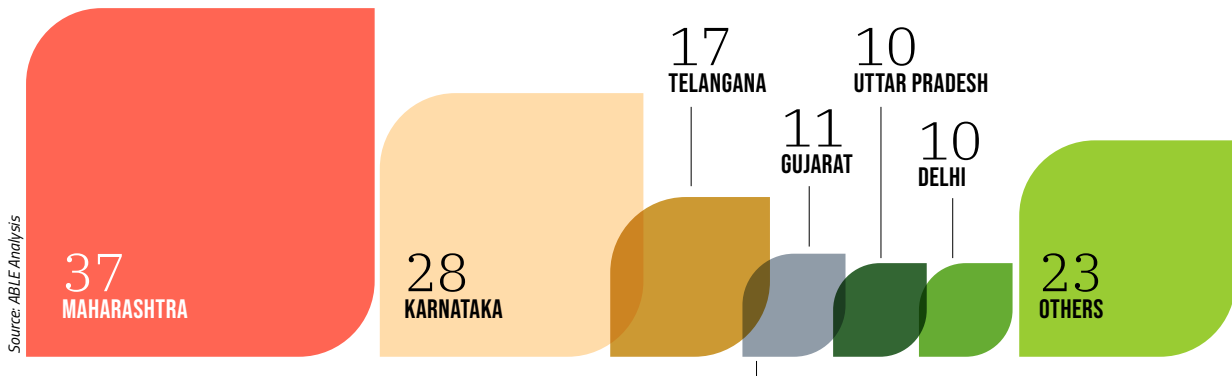
- Combined Market Size: \$7.66 billion - Percentage Share: 5.58% - Reflects the immediate response and adaptability during the COVID-19 pandemic.

The BioEconomy sub-segments exhibit a diverse range of contributions, reflecting the integration of biotechnological advancements across industries. BioAgri, BioIndustrial, BIOITResearch Services, and BioPharma play pivotal roles, with notable contributions from specific applications such as Bt Cotton, Aqua (Shrimp), and Enzymes. The sector's ability to address global challenges, as seen in the Covid Testing and Vaccines sub-segment, underscores its resilience and adaptability.

## REGIONAL OVERVIEW

The BioEconomy in India is a collaborative effort, with various states playing significant roles in driving growth, innovation, and sustainability. Maharashtra, Karnataka, and Telangana were key contributors. These states showcase diverse strengths across biotechnology, research, pharmaceuticals, and BioIndustrial sectors.

### BIOECONOMY IN \$ BILLION VS. STATE



Source: ABLE Analysis

#### 1. Contribution by Share (\$ Million):

##### MAHARASHTRA:

- Share: 27%
- BioEconomy Contribution: \$37.46 Billion
- A leading state with a substantial contribution, emphasizing diverse bio-based sectors. Leading in terms of both share and actual BioEconomy value.

##### KARNATAKA:

- Share: 20%
- BioEconomy Contribution: \$27.71 Billion
- Prominent in biotechnology and research, contributing significantly to the national BioEconomy.

##### TELANGANA:

- Share: 12%
- BioEconomy Contribution: \$16.74 Billion
- Notable contributions from the pharmaceutical and biotech sectors, fostering innovation.

##### GUJARAT:

- Share: 8%
- BioEconomy Contribution: \$11.02 Billion

- Strong emphasis on BioIndustrial applications and sustainable practices.

##### UTTAR PRADESH:

- Share: 8%
- BioEconomy Contribution: \$10.32 Billion
- Diversified contributions, including agriculture and healthcare, driving BioEconomy growth.

##### DELHI:

- Share: 7%
- BioEconomy Contribution: \$10.08 Billion
- Notable contributions from research and healthcare sectors, leveraging the capital's resources.

##### OTHERS:

- Share: 17%
- BioEconomy Contribution: \$23.91 Billion
- Cumulative contribution from other states, highlighting the collective strength of diverse regions.



## FUTURE FORECAST

**2025 Projection:** The cumulative impact of the discussed trends and drivers positions the Indian biotechnology sector for significant growth, with the BioEconomy projected to reach the ambitious \$150 billion mark by 2025. Continued focus on innovation, global market penetration, and sustainable practices will be pivotal in achieving this milestone.

**2030 Vision:** Looking ahead to 2030, the forecast suggests a BioEconomy worth \$270–300 billion, accounting for 3.3–3.5% of India's GDP. Key contributors include a robust Biopharma sector, a thriving BioIndustrial segment, and a flourishing BioServices sector. Achieving this vision will require sustained government initiatives, strategic collaborations, and a commitment to technological advancements. The sector's ability to navigate challenges, capitalize on global opportunities, and embrace innovation positions it as a key driver of India's economic growth. Strategic planning, regulatory support, and continuous collaboration will be paramount in realizing the full potential of the Indian biotechnology sector.

### CHARACTERISTICS OF INDIA'S BIOECONOMY

#### AMBITIOUS GROWTH TARGETS:

- India aims to touch the \$150 billion threshold by 2025, showcasing its determination for rapid growth in the BioEconomy.

#### DIVERSE CONTRIBUTION SECTORS:

- BioPharma, BioAgri, BioIndustrial, and BioIT are major contributors, reflecting a diversified approach to harnessing biotechnological advancements.

#### NOTABLE RESILIENCE DURING PANDEMIC:

- The BioEconomy, particularly the Vaccine manufacturers, played a pivotal role during the pandemic, contributing nearly a quarter of the 2021 BioEconomy.

### INDIA BIOECONOMY'S FUTURE OUTLOOK

#### SECTORAL GROWTH PREDICTIONS:

- BioPharma, Diagnostics, Vaccines, BioIndustrial, BioAgri, and BioServices are expected to experience significant growth, propelling the BioEconomy toward the \$150 billion mark.

#### GOVERNMENT SUPPORT:

- Government initiatives, such as amendments to the National Policy on Biofuels, contribute to the

growth and sustainability of India's BioEconomy.

- Strategic initiatives during the pandemic and amendments to support BioEconomy growth.

#### GLOBAL RECOGNITION AND EXPORT POTENTIAL:

- India's biosimilars gaining acceptance in developed markets positions the nation as a potential global supplier of cost-effective BioPharmaceuticals.

#### GROWTH TARGETS:

- Value: Aims to reach \$150 billion by 2025, with a potential to double to \$300 billion by 2030.
- GDP: The US contributes over 5% to GDP and India is at 4%. This emphasizes the importance of a mature and substantial BioEconomy.

#### CHALLENGES AND SCOPE:

- Potential challenges in sectoral diversification and global market penetration.

#### BIOTECHNOLOGICAL APPLICATIONS:

- Growing emphasis on green and sustainable practices, circular economy, and fostering innovation.

India exhibits a dynamic and growing BioEconomy with a focus on emerging sectors, while the U.S. boasts a mature and diverse landscape with a broad impact on its economy.





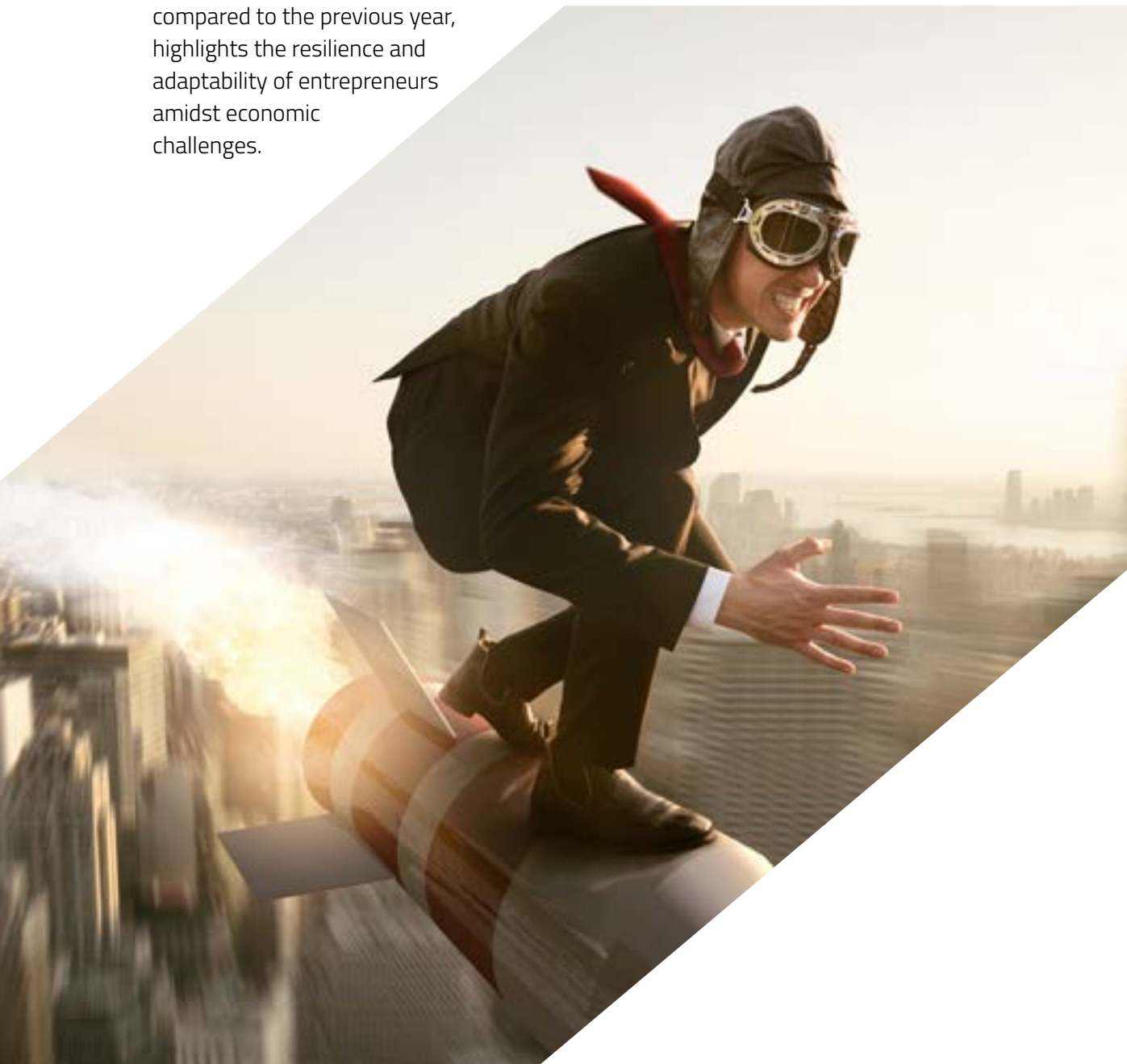


# STARTUP ECOSYSTEM

# THE BIOTECH STARTUP BOOM CONTINUED IN 2022

In 2022, 1391 biotech startups joined the ecosystem, expanding the 10-year total to 6,755.

The incorporation of new biotech startups in 2022 marked a remarkable chapter in the entrepreneurial landscape. With a total of 1391 startups formed, the year not only showcased quantitative growth but also witnessed an impressive 23.3% increase in the startup growth rate. This surge, compared to the previous year, highlights the resilience and adaptability of entrepreneurs amidst economic challenges.



## YEARLY OVERVIEW

**Startup Count Trends:** In 2020, the market saw the emergence of 840 startups, and this number experienced a significant surge to 1128 in 2021, boasting a substantial growth rate of 34.3%. The upward trajectory persisted in 2022, with 1391 startups and a growth rate of 23.3%.

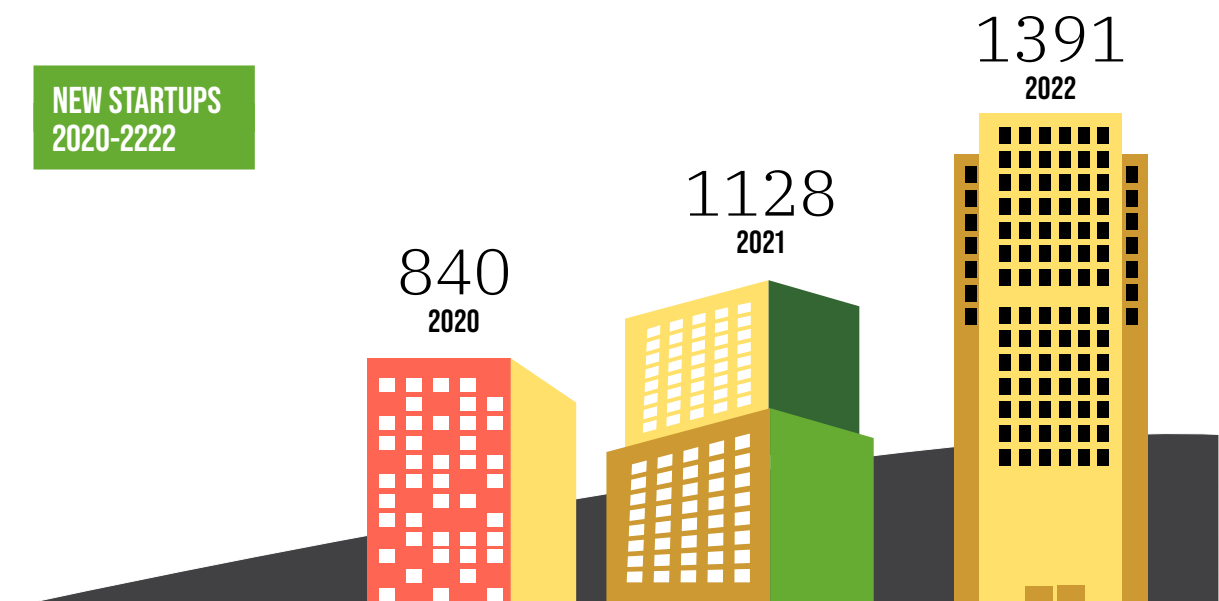
**Yearly Growth Comparison:** Comparing growth percentages reveals a noteworthy expansion from 2020 to 2021, with a substantial 20 percentage point increase. Although the growth rate slightly decreased by 11 percentage points in 2022, the absolute number of startups continued to rise, indicating a sustained positive trend in the entrepreneurial sector.

**Exceptional Performance in 2022:** The exceptional performance of startups in 2022, characterized by a significant increase in both quantity and growth rate, underscores the resilience and vibrancy of the entrepreneurial ecosystem. This

positive trend signals continued growth and innovation within the startup sector, emphasizing its pivotal role in driving economic development and fostering a culture of entrepreneurship.

**Quarterly Dynamics:** In 2022, the startup landscape maintained its growth momentum, with the second quarter (Q2) witnessing the highest number of startups. Despite occasional declines in specific quarters, the overall trend showcased the resilience and adaptability of the startup ecosystem, demonstrating its ability to rebound and thrive.

**Average Quarterly Registrations:** The average quarterly registrations in 2022 reached approximately 348 startups, surpassing the 2021 average of 282 startups. This suggests a higher rate of startup registrations per quarter in 2022. The average quarterly registrations growth from 2021 to 2022 is estimated at approximately 23.32%.



Source: ABLE Analysis

## TOP MONTHS FOR REGISTRATIONS IN 2022

**May 2022:** May emerged as the paramount month for startup registrations in 2022, witnessing an impressive count of 136 startups. This remarkable figure showcased a pinnacle in entrepreneurial activity, signifying a period of heightened interest and engagement in the startup landscape.

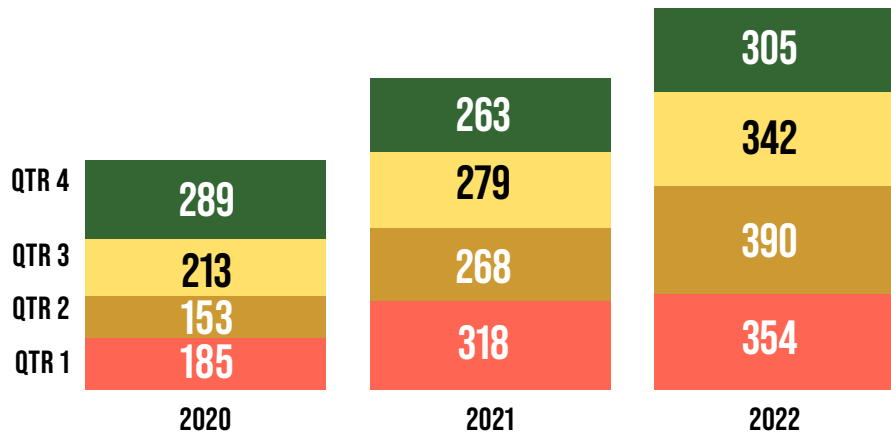
**June 2022:** Securing the second position, June 2022 registered a robust count of 130 startups. This further exemplified the consistent and dynamic nature of startup registrations, reinforcing the year's positive trend.

**April 2022:** Claiming the third spot, April 2022 contributed significantly to the overall growth of the year with 124 startups. The month demonstrated the eagerness to form startups at the beginning of the Indian financial year starting on April 1, 2022.

**March 2021:** March 2021 stood out as the leading month for registrations in 2021, experiencing a surge with 135 startups. This robust start to the year indicated a period of heightened entrepreneurial activity and innovation.

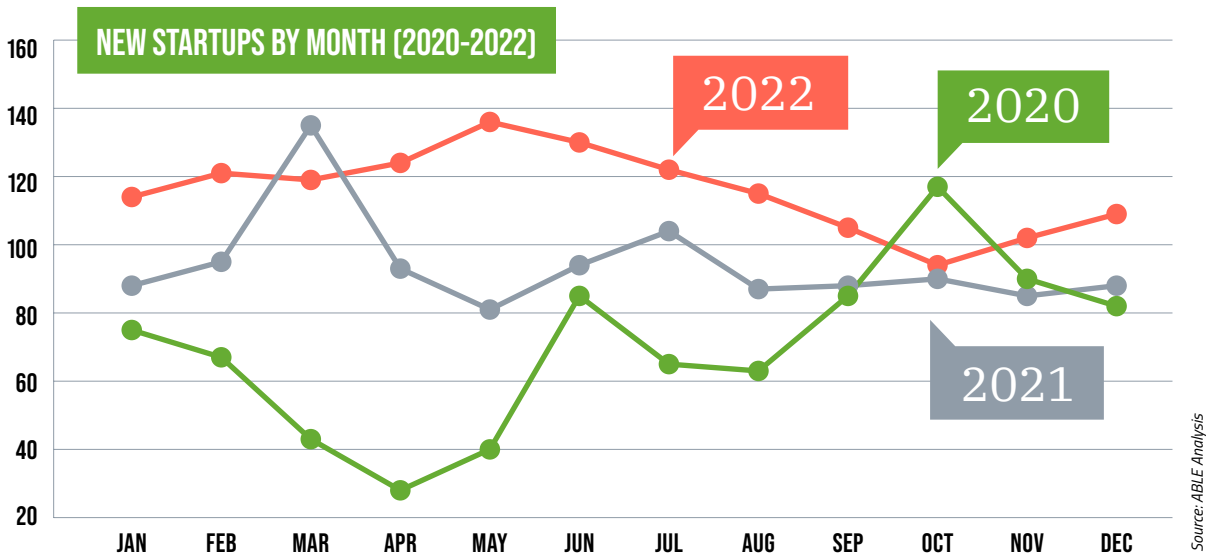
### NEW STARTUPS: A QUARTERLY OVERVIEW (2020-2022)

Source: ABLE Analysis



## MONTHLY AVERAGES

2022: The monthly average for startup registrations in 2022 was approximately 116. In 2021, the monthly average for startup registrations was approximately 94. This average highlighted the sustained and vibrant nature of entrepreneurial activities throughout the year.



Source: ABLE Analysis

## CATEGORIZATION OF STARTUPS

The startup registrations were widely distributed across nature of activities. This highlighted the dynamic and multifaceted nature of startup activities. The concentration in health, manufacturing, and business services indicated a robust entrepreneurial ecosystem that contributed to various sectors, fostering overall economic development.

### HEALTH AND SOCIAL WORK (32%)

The largest segment, comprising 32%, signified a substantial focus on health-related services and social initiatives. This underscored a growing emphasis on well-being and community welfare within the startup ecosystem.

### MANUFACTURING (CHEMICALS AND PRODUCTS THEREOF) (24%)

At 24%, the manufacturing of chemicals and related products emerged as a significant sector. This showcased the pivotal role startups played in industrial production and innovation.

### BUSINESS SERVICES (16%)

Representing 16% of the total, the business services sector demonstrated a substantial presence of startups engaged in providing diverse professional services.

### TRADING (9%)

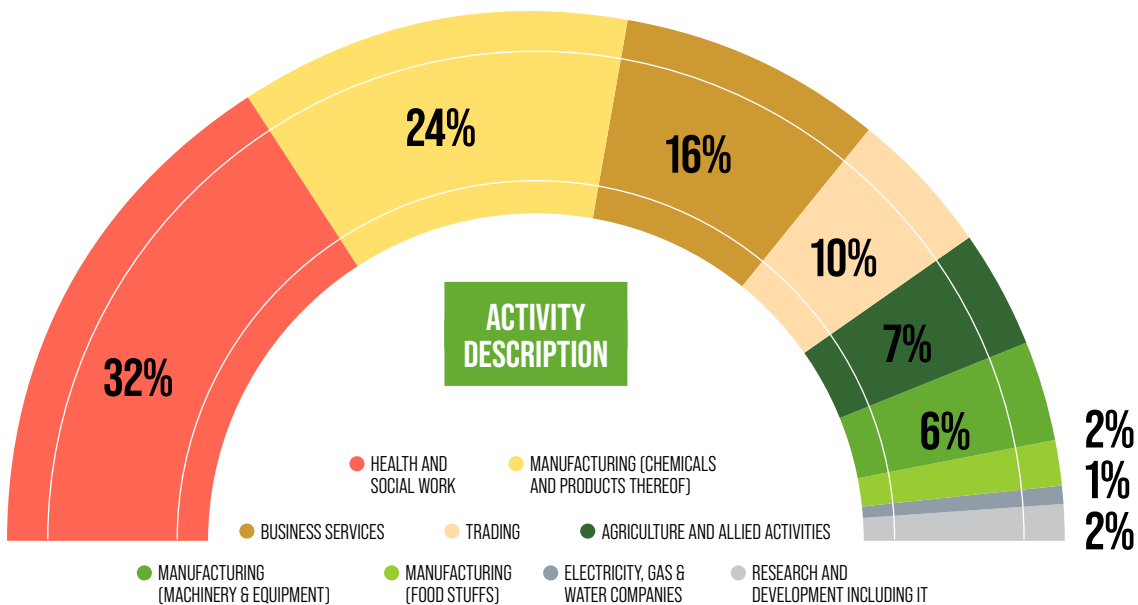
Trading activities contributed 9%, indicating the crucial role startups played in facilitating commerce and trade. This segment reflected a diverse range of startups offering products and services.

### AGRICULTURE AND ALLIED ACTIVITIES (7%)

Accounting for 7%, startups engaged in agriculture and allied activities jumped into the agricultural sector.

### RESEARCH AND DEVELOPMENT INCLUDING IT (2%)

At 2%, the Research and Development, including IT, segment underscored the contribution of innovation-driven startups to technological advancements and knowledge creation.



Source: ABL Analysis

## TOP 10 STATES FOR NEW STARTUPS (2022)

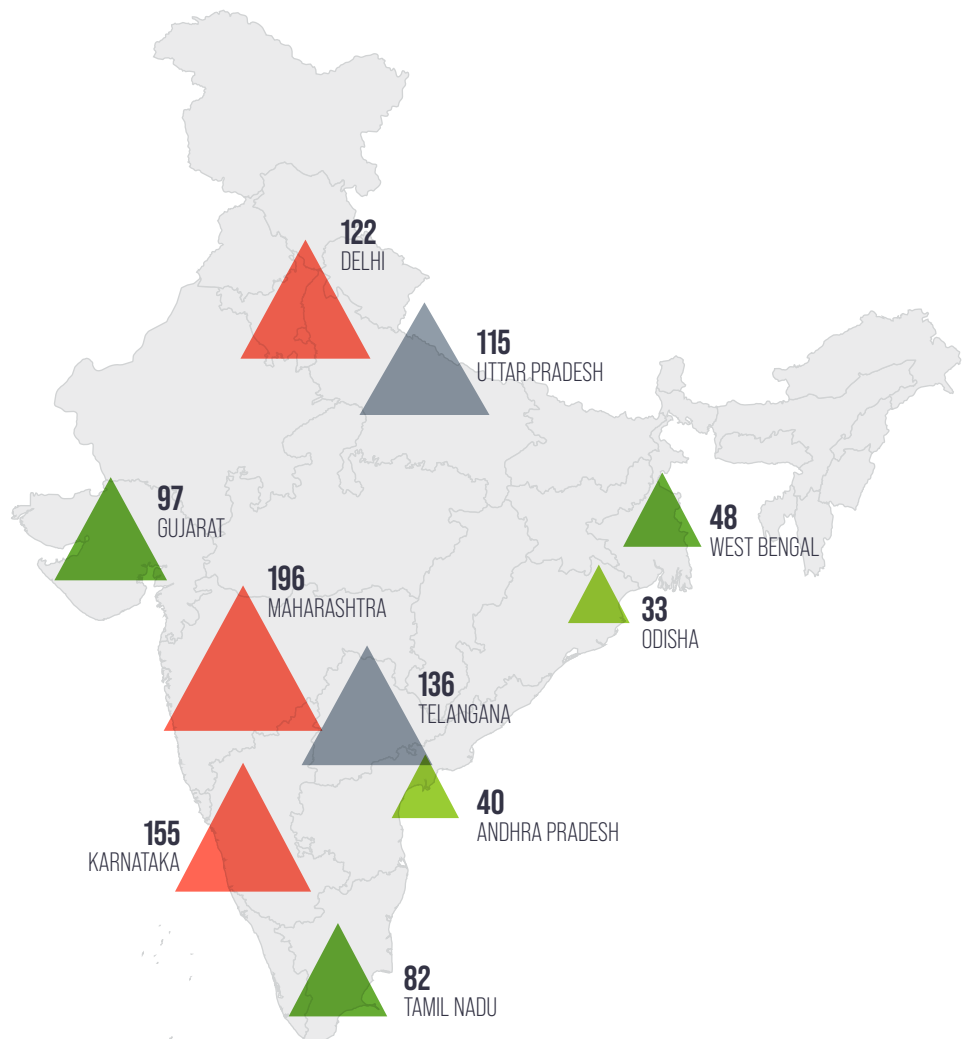
In 2022, the distribution of startups across Indian states highlighted a vibrant and multifaceted entrepreneurial landscape. Maharashtra, Karnataka, and Telangana emerged as prominent drivers of this growth, exhibiting remarkable growth rates and substantial shares of the overall startup ecosystem. This positive trend reflects a thriving entrepreneurial spirit, fostering economic development in various states.

- **Maharashtra (196 Startups):** Maharashtra led the registrations in 2022, hosting 196 startups, reflecting a remarkable 35% growth from the previous year. The state commanded a substantial 14% share in the overall startup count.
- **Karnataka (155 Startups):** Following closely, Karnataka featured prominently with 155 startups, exhibiting an impressive growth rate of 63% from 2021. The state held a significant 11% share in the total startup count.
- **Telangana (136 Startups):** Telangana secured the third position, hosting 136 startups, showcasing a commendable growth rate of 36%. The state contributed 10% to the total startup landscape.
- **Delhi (122 Startups):** Delhi recorded

### NEW STARTUPS: TOP 10 STATES

Maharashtra witnessed the largest number of new registration in 2022, followed by Karnataka about 1391 new startups were formed in 2022, The Top 10 states accounted for 1060 new registration. 390 new startups were formed in the rest of the states.

Source: ABLE Analysis



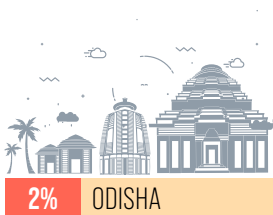
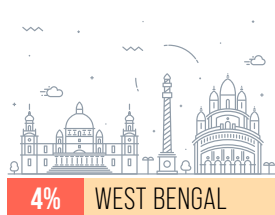
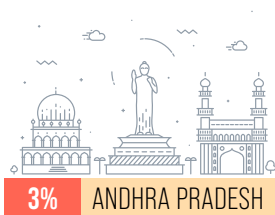
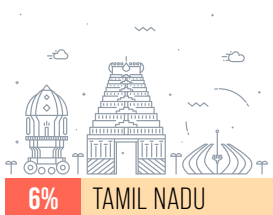
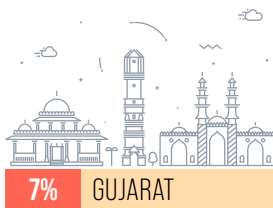
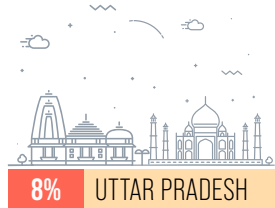
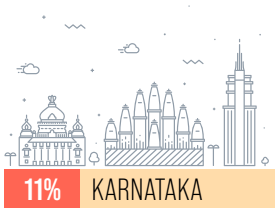
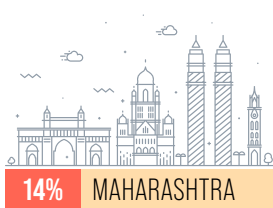


122 startups, experiencing a growth rate of 36% and holding a 9% share in the overall startup count.

- **Uttar Pradesh (115 Startups):** Uttar Pradesh emerged as a significant player with 115 startups, marking a growth rate of 24%. The state contributed 8% to the total startup ecosystem.
- **Gujarat (97 Startups):** Gujarat featured prominently with 97 startups, showcasing a growth rate of 29%. The state contributed 7% to the total startup count.
- **Tamil Nadu (82 Startups):** Tamil Nadu registered 82 startups, exhibiting a growth rate of 26% and holding a 6% share in the overall startup landscape.
- **West Bengal (48 Startups):** West Bengal recorded 48 startups, reflecting a

growth rate of 20%. The state contributed 3% to the overall startup ecosystem.

- **Andhra Pradesh (40 Startups):** Andhra Pradesh showcased growth with 40 startups, marking a 33% increase. The state held a 3% share in the total startup count.
- **Odisha (33 Startups):** Odisha featured in the top 10 with 33 startups, exhibiting a growth rate of 32% and holding a 2% share in the total startup count.
- **Other States and Grand Total:** The “Others” category encompassed various states, contributing 26% to the overall startup count. In 2022, there were a total of 1391 startups, reflecting a 23% growth from the previous year’s count of 1128.



Source: ABLE Analysis

## HIGHLIGHTS AND OVERALL PERFORMANCE OF BIOTECH STARTUPS

### ANALYSIS OF CUMULATIVE STARTUPS (2015-2022)

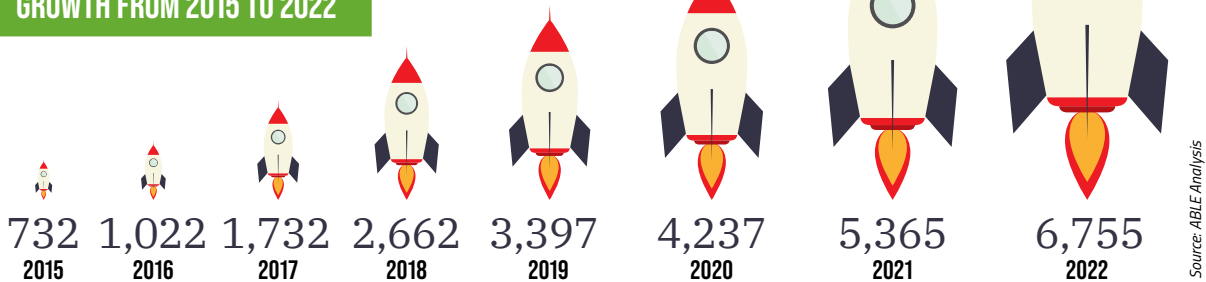
The cumulative growth of startups experienced a consistent upward trajectory between 2015 and 2022. The cumulative count of startups continued to increase, reaching 6755 by the end of 2022, reflecting an overall growth rate of 26.0%. In 2015, there were 732 startups. By 2016, the number crossed the 1000 milestone. The startups grew by approximately 9.22 times since 2015. So, the Compound Annual Growth Rate (CAGR) since 2015 was approximately 37%.

**Yearly Growth Rate:** Noteworthy accelerations were observed in 2016-2017 (69.61%) and 2017-2018 (54%). This is clearly an outcome of the establishment of the Biotechnology Industry Research Assistance Council (BIRAC) in 2012 to promote the bio-

tech startup ecosystem in the country.

**BIRAC's Contribution to the Biotech Innovation Ecosystem:** BIRAC, established by the Department of Biotechnology (DBT), served as an industry-academia interface, aiming to strengthen and empower emerging biotech enterprises for strategic research and innovation. Its mandate was to nurture innovation throughout the entire product development chain, from the idea stage to proof-of-concept, early and late-stage translational research, validation, and scale up to commercialization. Over the past 10 years, BIRAC undertook various initiatives, including providing funds for high-risk translational research, supporting nascent ideas, and capacity building through specialized bio-incubation centers.

### A LOOK AT THE CUMULATIVE GROWTH FROM 2015 TO 2022



## BIRAC'S IMPACT FROM 2014 TO 2022

- Biotech Startups: Grown from less than 700 to 6755, a multiplier of 9x.
- Incubators: Increased from 6 to 75, a multiplier of 12x.
- Number of Products: Expanded from 10 to 800, a multiplier of 80x.
- Fund Raised: Increased from less than \$2 million to \$535 million, a multiplier of 268x.
- Jobs Created: Grown over 60 times to over 30,000.

BIRAC's relentless efforts have significantly contributed to the growth and development of the biotech innovation ecosystem in India. Despite economic challenges, the startup ecosystem displayed resilience, maintaining positive growth rates.

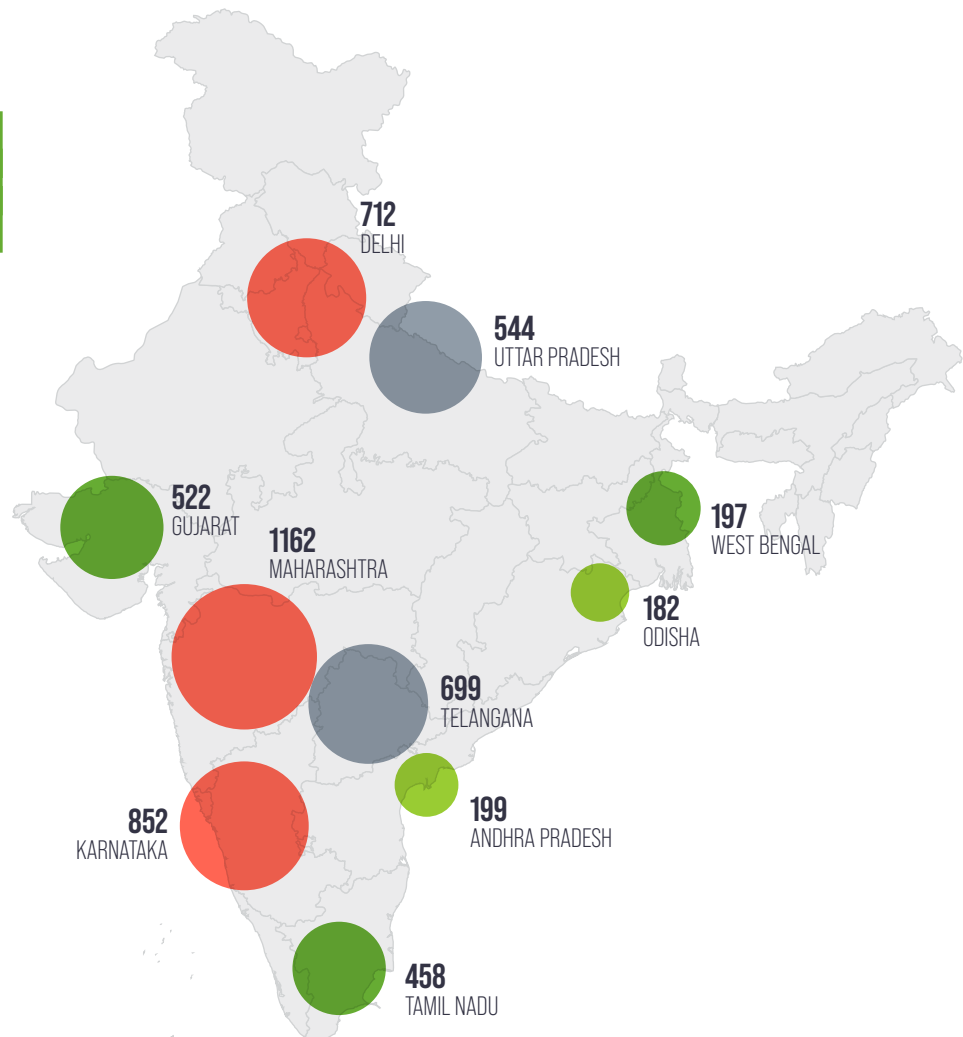
## REGIONAL AND SECTORAL ANALYSIS: REGIONAL DISTRIBUTION (BIOTECH STARTUPS - 2022):

- **Maharashtra:** In 2022, Maharashtra led with a cumulative base of 1162 biotech startups, experiencing a growth of 20%.
- **Karnataka:** Karnataka exhibited a significant increase, reaching a cumulative base of 852 startups, reflecting a growth rate of 22%.
- **Telangana:** Telangana showcased robust growth with 699 biotech startups, indicating a growth rate of 24%.
- **Delhi:** The Delhi region maintained its prominence with 712 biotech startups, showing a growth rate of 21%.
- **Uttar Pradesh:** Uttar Pradesh experienced rapid growth, reaching 544 biotech startups, and a growth rate of 27%.
- **Gujarat:** Gujarat contributed to the overall expansion with a cumulative base of 522 startups, growing by 23%.
- **Tamil Nadu:** Tamil Nadu continued to be a key player, reaching 458 biotech startups with a growth rate of 22%.
- **West Bengal:** West Bengal demonstrated exceptional growth, reaching 197 biotech startups, with a growth rate of 32%.
- **Odisha:** Odisha contributed to the diversity with 182 biotech startups, growing by 22%.
- **Others:** Other regions collectively contributed significantly, showcasing a growth rate of 42%.

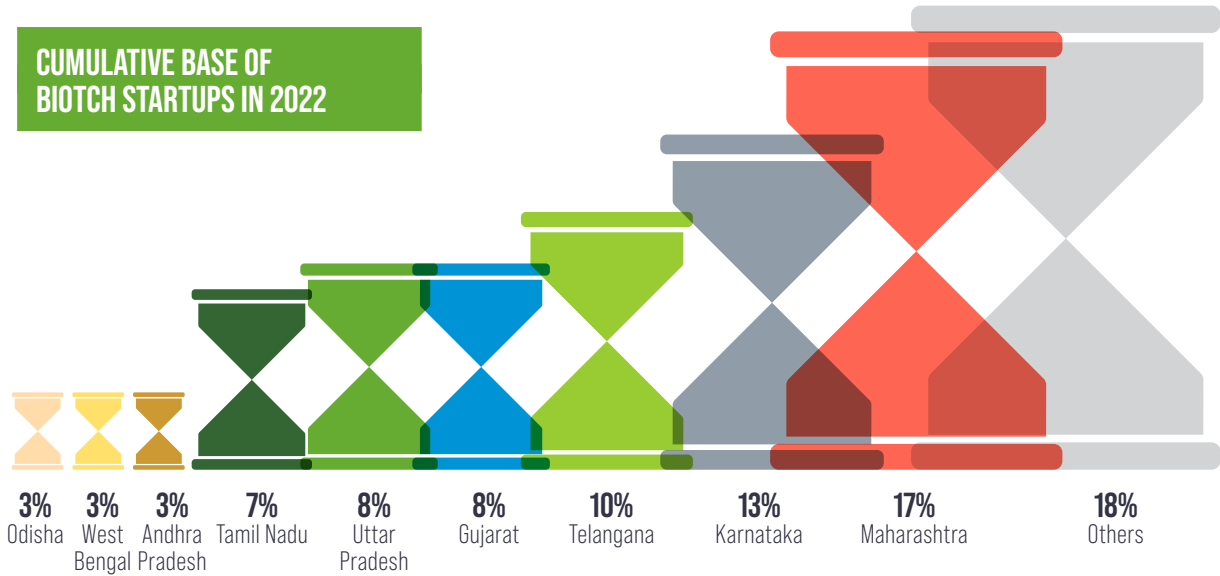
Implications and Trends: Understanding the sustainability and scalability of startups will be crucial for shaping future policies. The

### CUMULATIVE BASE OF BIOTECH STARTUPS IN 2022 (BY REGION)

The spread of Biotech companies in India. The total cumulative base reached 6755 in 2022.



Source: ABLE Analysis



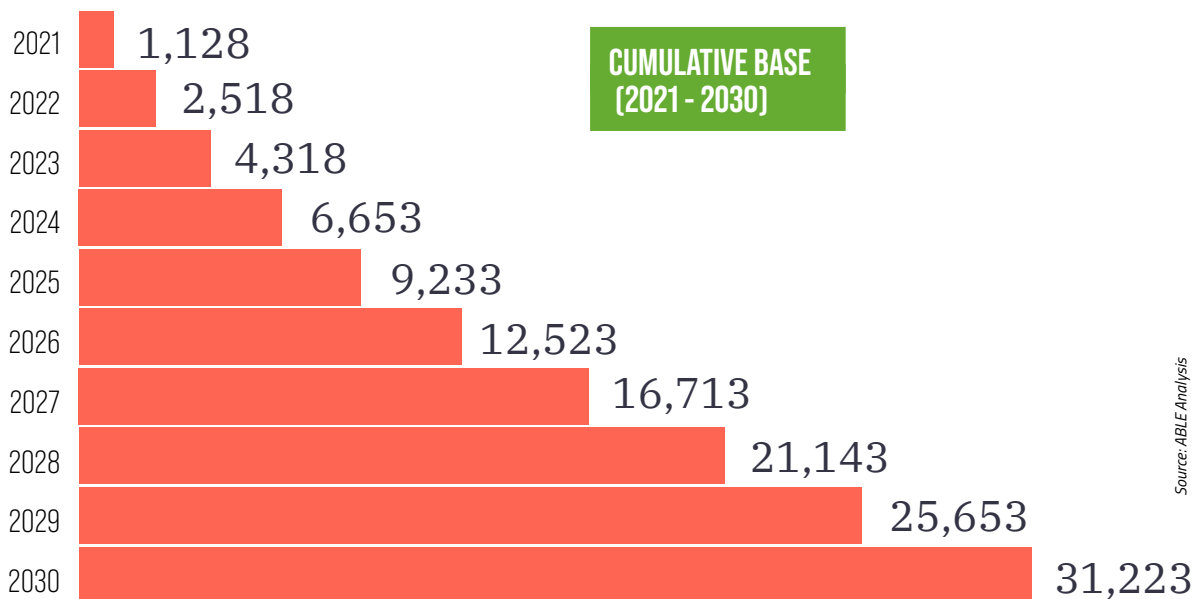
sentiment is positive and with the support from the government and participation of all the stakeholders the industry is expected to have nearly 31000 startups between 2021 and 2023.

While predicting the future and growth with certainty is challenging, the provided data indicates a substantial and consistent increase in cumulative startups over the next decade. Here's a summary of the predicted growth based on past trends and industry sentiments:

- 2021 to 2022: The cumulative startups

more than double from 1128 to 2518, indicating significant growth.

- 2022 to 2023: The growth continues, with the cumulative startups reaching 4318, demonstrating a substantial increase of 42%.
- 2023 to 2024: The trend of growth persists, with the cumulative startups reaching 6653. The ecosystem is projected to experiences a 35% growth.
- 2024 to 2025: The cumulative startups further are expected to increase to 9233, showing a steady upward trajectory of 28%.



Source: ABLE Analysis

- 2025 to 2026: A 26% percent increase is forecast, with the cumulative startups reaching 12523.
- 2026 to 2027: If the growth trend continues, India is expected to have 16713 cumulative startups.
- 2027 to 2030: The cumulative startups base is forecast to further increase to 31223, based on consistent upward trajectory.

While these projections are based on the provided data, several external factors could influence the actual growth of startups, such as economic conditions, government policies, technological advancements, and global events. It's essential to consider these variables and regularly update predictions to account for changing circumstances in the entrepreneurial landscape.

## BIRAC'S INITIATIVES: STRATEGIC COLLABORATIONS AND PARTNERSHIPS

BIRAC's programs, schemes, and policy initiatives were supplemented through strategic collaborations and public-private partnerships with national and international bodies, government departments, states, industry, investors, mentors, experts, philanthropic organizations, and NGOs.

**Central Enabler and Impact on the Biotech Innovation Ecosystem:** BIRAC, as a central enabler, played a crucial role in nurturing the biotech innovation ecosystem in India, aiming to develop globally competitive and affordable products to address the unmet needs of society.

**Entrepreneurship and Start-up Support:** BIRAC fostered a culture of biotech entrepreneurship, creating a pipeline of over 11,000 aspiring entrepreneurs and 6700+ biotech startups. Recognizing that the biotech innovation ecosystem is largely driven by startups, BIRAC supported 4800+ startups, entrepreneurs, and other beneficiaries.

**Biotech Innovation Network:** BIRAC established a vibrant biotech innovation network, including 75 bio-incubators across 21 states/UTs supporting 1800+ incubatees. This network also included four regional centers for mentoring and handholding, seven technology transfer offices, and twelve daughter funds under the Fund of Funds initiative.

**Regulatory Information Facilitation Centre and IP Impact:** BIRAC supported about 800 regulatory queries from startups, entrepreneurs, and innovators through the BIRAC Regulatory Information Facilitation Centre platform. BIRAC's efforts led to the filing of over 1300 intellectual property (IP) applications, with over 800 biotech product technologies reaching the market.

**Biotechnology Innovation Fund-Accelerating Entrepreneurs (AcE) Fund:** The Biotechnology Innovation Fund-Accelerating Entrepreneurs (AcE) Fund, a 'Fund of Funds,' was launched to invest equity in startups, providing the risk capital for innovation, research, and product development. AcE mobilized over \$120 million, with BIRAC/DBT committing \$15 million in biotech startups and small to medium-sized enterprises (SMEs).

**Funding Support to Startups:** Out of 11,000+ new innovative ideas, BIRAC supported:

- 950+ startups under the 'Biotech Ignition Grant.'
- 159 startups provided equity investment through SEED and LEAP Fund.
- 77 companies provided investment through Fund of Funds-AcE Fund.





# BIOTECH INVESTMENTS



# BIOTECH INVESTMENTS



## KEY INSIGHTS

Biotech Investments have reached new heights amidst pandemic-driven shift towards healthcare value plays.

The biotech industry witnessed a remarkable year in 2022, with a record-breaking surge in biotech Private Equity (PE) and Venture Capital (VC) investments. The total biotech investments reached an impressive \$938.8 million, registering a 19% growth in private equity investments compared to the preceding year.

- Notably, 2021 and 2022 accounted for a significant portion (nearly 35 percent) of the total investments of \$4.9 billion made in the biotech sector between 2013 and 2022, highlighting the recent surge in interest and financial backing for this transformative field.
- Both the years also showed a relative-

ly high number of deals—32 and 31, respectively—indicating increased interest and confidence in the biotech sector during these periods.

- The biotech sector has experienced a resurgence of interest, particularly following the pandemic. In the initial stages, the growth was propelled by the pharmaceuticals sector due to pandemic-driven tailwinds. Subsequently, there has been a shift towards the healthcare sector, emphasizing value plays.
- The increased interest in PEVC investments in the biotech sector is attributed to expanding investment opportunities. Traditionally centered around biopharmaceuticals and diagnostics services, the sector has seen a shift in the last two to three years towards emerging areas including dig-

ital health, consumer health, self-care, medical devices, platform technology, point-of-care devices, animal health, drug discovery, and biotech.

- This transformation has been driven by two main factors: firstly, the impact of the coronavirus pandemic, and secondly, favorable government policies such as the Ayushman Bharat health insurance scheme introduced in 2019, the National Digital Health Mission (NDHM) initiated in 2021, the Artificial Intelligence (AI) initiative, BIRAC's programs to nurture the biotech innovation ecosystem through Biotech

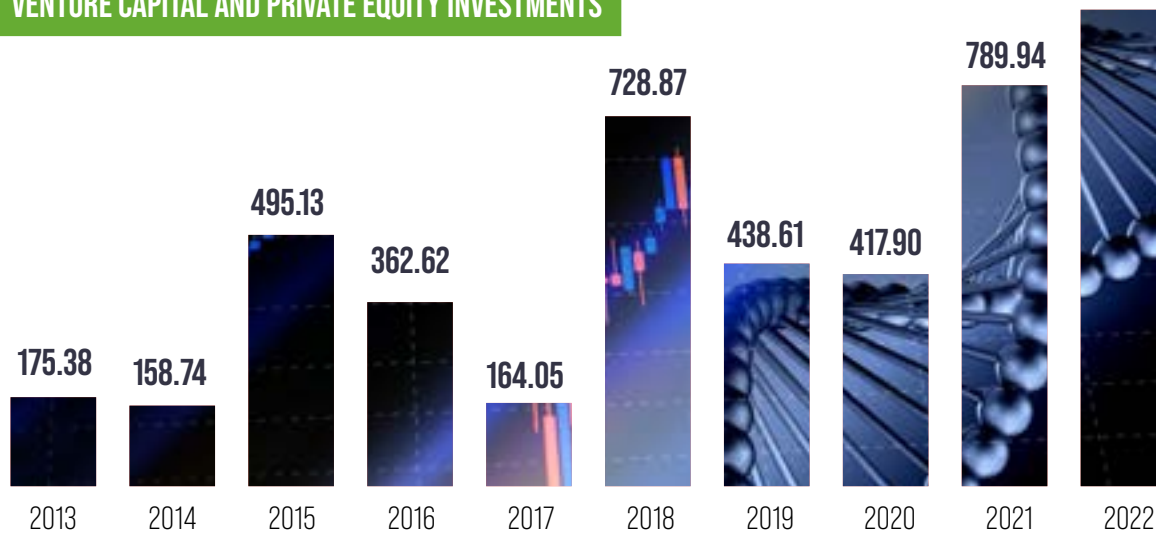
Ignition Grant (BIG), equity investment through SEED and LEAP Fund, and investments through Accelerating Entrepreneurs (AcE), a fund under Biotechnology Innovation Fund, and the fostering of high-performance bio-manufacturing.

- The disruptions in the global supply chains due to COVID-19 prompted major pharmaceutical companies to reconsider their strategies, leading to a diversification of sourcing. India is expected to benefit significantly from this trend.

## PE & VC INVESTMENTS IN INDIAN BIOTECHS

Biotech Industry booms with Record-Breaking investments and expanding opportunities

### VENTURE CAPITAL AND PRIVATE EQUITY INVESTMENTS



Source: ABLE Analysis

#### DISCLAIMER

- The life sciences sector, encompassing healthcare, pharma, and biotech, stands out as one of the most exciting and promising areas for private equity (PE) investment. This sector benefits from several favorable trends, including aging populations, an increase in chronic diseases, and advancements in technology. Consequently, PE firms have been making substantial investments in these sectors, placing their bets on the long-term growth potential.

- Various investment tracking reports, such as Ernst & Young (EY) analysis of VC Edge data, Bain reports, Tracxn Reports, or Venture Intelligence Lifesciences Reports, indicate that the overall life sciences sector deals fall within the range of \$4.1-4.5 billion. This figure represents the total PEVC investments across the life segments, including pharmaceuticals and healthcare.
  - However, this IBER report specifically focuses on deals

within the realms of Biotech and bioinformatics, diagnostic services, drug discovery in biotech, biopharmaceuticals, biomanufacturing, medical devices, agritech companies, alternate fuels, etc. It intentionally excludes sectors such as hospitals, pharma distribution e-commerce companies, pure-play pharma companies, etc.

- The analysis has been conducted based on data sourced from Venture Intelligence, Tracxn, and EY Reports.

A comprehensive analysis of the biotech investment landscape spanning from 2013 to 2022 revealed a dynamic journey marked by fluctuations in the number of deals, investment amounts, and significant percentage changes. The years with the highest deal amount in the life sciences sector were 2021 and 2022. In 2015, there were 36 deals, marking the highest number of deals in the provided data. Similarly, in 2022, there were 31 deals, making it one of the years with a substantial number of transactions. These years stood out as periods of heightened activity and significant deal-making in the life sciences sector.

The best years in terms of deal amounts in the life sciences sector were 2021 and 2022. In 2022, the total deal amount reached \$938.77 million, making it the highest recorded amount in the gathered data, while in 2021, the total deal amount was \$789.94 million. These years stood out as periods with substantial investment amounts in the life sciences sector.

In 2022, PEVC investments in the life sciences sector witnessed a 5% growth, following a substantial 15% year-on-year increase in 2021. Notably, the dominance of pharmaceuticals in 2020 with an 87% share declined to 51% in 2021 and further to 45% in 2022.

#### OVERALL TRENDS:

- **Deal Count:** The number of biotech deals fluctuated over the years, reaching a peak in 2015 with 36 deals and averaging around 27 deals in a year since 2013.
- **Investment Amounts:** The total investment amounts showcased significant variations, with 2018 and 2022 standing out as peak years, marked by substantial increases.

#### YEARLY ANALYSIS:

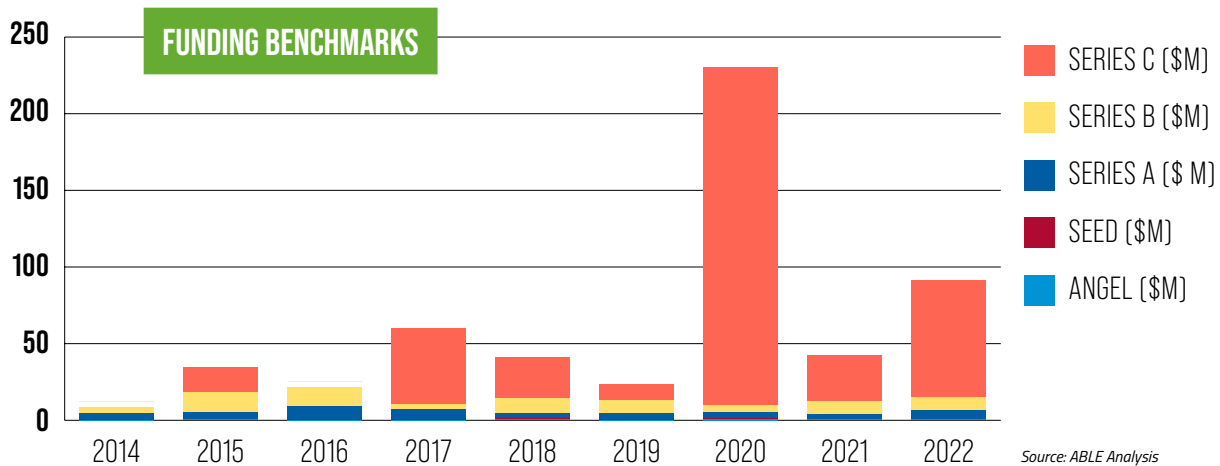
- **2013 (4% Share):** The year started with 24 deals amounting to \$175.38 million,

contributing 4% to the overall share of biotech investments.

- **2014 (3% Share, -9% Change):** Despite a 9% decrease in investment, the number of deals dropped to 20, resulting in a 3% share.
- **2015 (10% Share, 212% Change):** A substantial increase of 212% in investment led to 36 deals, capturing a 10% share and signifying a significant boom in the biotech sector.
- **2016 (7% Share, -27% Change):** The number of deals reduced to 29, and a 27% decrease in investment marked a temporary slowdown in growth.
- **2017 (3% Share, -55% Change):** Investment plummeted by 55%, reaching \$164.05 million, and the number of deals reduced to 24, reflecting a challenging year for biotech investments.
- **2018 (15% Share, 344% Change):** A remarkable recovery occurred in 2018, with 27 deals amounting to \$728.87 million, signaling a 344% increase in investment.
- **2019 (9% Share, -40% Change):** Despite a decrease in both deals and investment, 2019 remained a significant year for the biotech sector.
- **2020 (9% Share, -5% Change):** The investment decreased slightly by 5%, with 26 deals contributing to a 9% share.
- **2021 (16% Share, 89% Change):** A robust year for biotech investments, 2021 witnessed 32 deals with a total investment of \$789.94 million, marking an 89% increase.
- **2022 (19% Share, 19% Change):** The positive trend continued in 2022, with 31 deals and an investment increase of 19%, capturing a 19% share.

## DISTRIBUTION OF INVESTMENTS BY DEAL SIZE

Quick analysis of decade of funding trends from 2014 to 2022, focusing on key parameters such as Funding Round Size, Funding Multiples, Funding Round Valuation, Time between Funding Rounds, Acquisitions, IPOs, and overall benchmarks.



### FUNDING ROUND SIZE:

The average funding round size in million dollars increased over time between 2013 and 2022, with Series C rounds receiving an average funding of \$47.1 million in 2022. The number of funding rounds also increased over time, with Series B rounds being the most common type of funding round. The time between funding rounds decreased over time, reaching an average of 41 days between rounds in 2022.

The increasing average funding round size and valuation were signs that investors became more confident in the potential of biotech companies in India. The increasing number of funding rounds suggested there was a growing demand for capital from biotech companies, and investors were willing to provide that capital. The decreasing time between funding rounds suggested that biotech companies were able to raise capital more quickly, which could help them accelerate their growth.

### OVERALL TRENDS:

The funding landscape for early-stage biotech companies in India changed rapidly. Companies that were able to raise

significant capital and execute on their business plans were well-positioned for success. Investors became more selective, so companies needed to have a strong product or service and a clear path to market to attract funding.

### FUNDING ROUND VALUATION:

- **Average Valuation:** The average funding round valuation stood at \$4.94 million. This metric gauged the perceived worth of companies during various funding rounds.

- **Yearly Trends:** The highest average valuation was recorded in 2016 at \$8.39 million.

### TIME BETWEEN FUNDING ROUNDS:

- **Average Time Gap:** The average time between funding rounds was 8.66 months. A shorter time gap might indicate rapid growth or fundraising success.

- **Yearly Insights:** Notable variations existed, with the longest time gap occurring in 2015 at 13.6 months. Subsequent years exhibited a relatively consistent pattern.

## PE INVESTMENTS BY STATE

Biotech Investment Deals Analysis (2013-2022) - Regional Distribution.

Analysis of biotech investments by region and state in India from 2013 to 2022 showed that the South and West regions dominated biotech investments, with a combined share of 73%. The total size of investments during the period was \$4.87 billion.

Karnataka and Gujarat were the top-ranking states, with shares of 30% and 14%, respectively. Maharashtra, Telangana, and Delhi also made significant contributions to the biotech investment landscape. The Rest of the States category accounted for 8% of the total biotech investment share.

The concentration of biotech invest-

ments in the South and West regions of India could be attributed to several factors, including:

- The presence of leading biotech companies and research institutions in these regions.
- The proactive approach of state governments in promoting biotech investments.
- A strong entrepreneurial ecosystem.

### REGIONAL BREAKDOWN:

- **North (17%):** The northern states collectively contributed 17% to the total biotech investment deals. This region,

| Region State       | Investment Deal Amount<br>\$Million (2013-2022) | Percent Share<br>of Total Deals |
|--------------------|---|---------------------------------|
| South              | 2255.45   | 46%                             |
| Karnataka          | 1448.31   | 30%                             |
| Telangana          | 663.09  | 14%                             |
| Tamil Nadu         | 127.45  | 3%                              |
| Kerala             | 11.1  | 0%                              |
| AP                 | 5.5   | 0%                              |
| West               | 1405.7  | 29%                             |
| Gujarat            | 658.92  | 14%                             |
| Maharashtra        | 626.78  | 13%                             |
| Goa                | 120   | 2%                              |
| North              | 810.63  | 17%                             |
| Delhi              | 368.32  | 8%                              |
| Haryana            | 296.43  | 6%                              |
| Uttar Pradesh      | 145.88  | 3%                              |
| Rest of the States | 398.04  | 8%                              |
| <b>Grand Total</b> | <b>4869.82</b>                                  | <b>100%</b>                     |

Source: ABLE Analysis

comprising Delhi, Haryana, and Uttar Pradesh, showcased a noteworthy presence in the evolving biotech sector.

- **South (46%):** The Southern states, led by Karnataka and Telangana, emerged as the powerhouse, commanding a substantial 46% share. The region's prominence was evident in its diverse biotech hubs and proactive investment climate.
- **West (29%):** Gujarat and Maharashtra in the West jointly contributed 29%, underlining the region's significance in fostering biotech innovation. Mumbai and Pune played pivotal roles in this vibrant ecosystem.
- **Others (8%):** States beyond the major regions and the listed states collectively contributed 8%, showcasing a mosaic of innovation. This category highlighted emerging players and unique biotech narratives outside the primary focus areas.

## TOP STATES

- **Karnataka Occupied Biotech Throne (30%):** Karnataka emerged as the undisputed king, commanding a whopping 30% share of biotech investments. The top-ranking state, Karnataka, attracted investments totaling \$1.45 Billion. Bangalore's magnetic pull for biotech innovators and investors drove the deals.
- **Telangana Triumph: Hyderabad's Biotech Power Play (14%):** Hyderabad's rise in the biotech realm propelled Telangana to a commendable second place with a 14% share.
- **Gujarat's Biotech Blitz (14%):** A Western Dynamo Gujarat, a western dynamo, claimed a significant 14% share in India's biotech bonanza. The success came from the proactiveness of the state and its role in shaping the nation's biotech future.
- **Maharashtra Momentum (13%):** Mumbai-Pune Biotech Axis: Maharashtra followed closely, boasting a 13% share fueled by the Mumbai-Pune biotech axis. It was a bustling biotech corridor of the financial and cultural hub of India.
- **Delhi Drift:** The Capital's 8% Biotech Share: The national capital secured the fifth spot with an 8% share. Delhi's influence reverberated in the biotech landscape, blending politics and innovation.
- **Haryana Hustle:** A 6% Slice of Biotech Glory: Haryana, the rising star in the north, snatched a 6% share. The strategic location positioned Haryana as a noteworthy contender in the biotech race.
- **Uttar Pradesh Unleashed:** Breaking Biotech Barriers (3%): Uttar Pradesh broke barriers with a 3% share, marking its presence in the evolving biotech narrative of the north.
- **Southern Flourish:** Tamil Nadu's 3% Biotech Symphony: Tamil Nadu played a melodious tune with a 3% share, adding a southern flourish to India's biotech symphony.
- **Goa's Biotech Beachhead (2%):** Small State, Big Impact: Goa, though small, made a big impact with a 2% share.
- **Rising Stars:** The Collective Force of "Rest of the States" (8%): In the biotech constellation, the "Rest of the States" shone bright, contributing a collective force of 8%. Witness how these rising stars added diversity and depth to India's biotech investment galaxy.



## TOP DEALS IN 2022

In 2022, the top 10 deals by funding amounted to over \$635.5 million. The leading deal in 2022 was a PE round of \$210 million for Meril Life Sciences. Following closely was a series C round of \$85 million for Molbio Diagnostics. Other notable top deals included a series C round of \$80 million for Lifewell Diagnostics, a series C round of \$68 million for Accumax, and a series B round of

| Company Name         | Round Name | Round Amount (\$ Million) |
|----------------------|------------|---------------------------|
| Meril Life Sciences  | PE         | 210                       |
| Molbio Diagnostics   | Series C   | 85                        |
| Lifewell Diagnostics | Series C   | 80                        |
| Accumax              | Series C   | 68                        |
| Redcliffe Lifetech   | Series B   | 61                        |
| MedGenome            | Series D   | 50                        |
| Pathkind Diagnostics | Series A   | 25                        |
| String Bio           | Series B   | 20                        |
| Sea6 Energy          | Series B   | 18.5                      |
| Bugworks Research    | Series B   | 18                        |
| V-Ensure             | Series B   | 17.5                      |
| Elucidata            | Series A   | 16                        |
| Immuneel             | Series A   | 15                        |
| Goapptiv             | Series A   | 12.58                     |
| Dozee                | Series A   | 9.62                      |
| Rivaara Labs         | Series A   | 6.7                       |
| Eyestem              | Series A   | 6.4                       |
| Kapiva               | Series B   | 6.16                      |
| Epigeneres           | Series B   | 6                         |
| Achira               | Series B   | 3.21                      |
| FibroHeal            | Seed       | 0.55                      |
| Nayam Innovations    | Angel      | 0.44                      |

Source: ABLE Analysis

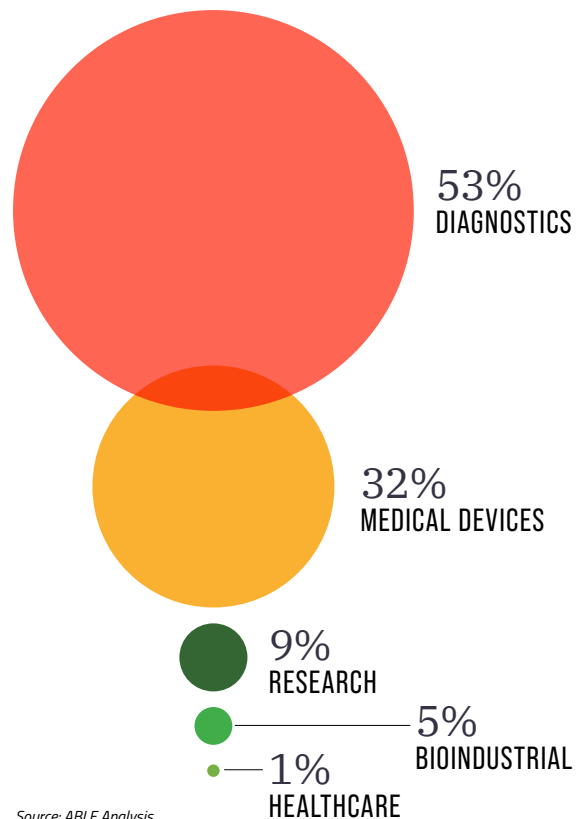
\$61 million for Redcliffe Lifetech. The total investment across various rounds and companies in the table amounted to \$735.66 million.

### INVESTORS FLOCK TO DIAGNOSTICS AND MEDICAL DEVICES: A TALE OF TWO SECTORS

The Diagnostics and Medical Devices sectors emerged as frontrunners, capturing the attention of investors with their immense potential and growth prospects. The Diagnostics sector, spearheading the charge, amassed over half of the total funding. This success could be attributed to the sector's crucial role in early disease detection and patient care, making it an indispensable component of the healthcare ecosystem.

The Medical Devices sector raised over

#### SEGMENT REPRESENTATION OF TOP COMPANIES



Source: ABLE Analysis



a quarter of the total funding that was raised by companies in the healthcare industry. This suggested that the Medical Devices sector was also a very attractive sector for investors.

The BioIndustrial and Research sectors raised the least amount of funding among all the sectors.

**DIVERSE FUNDING MIX**

In 2002, a diverse funding mix was witnessed, showcasing the availability of capital across different stages of company development. This diversity was positive for the overall health of the startup ecosystem.

| Round Name         | Deal Amount (\$ Million) |
|--------------------|--------------------------|
| PE                 | 210                      |
| Series A           | 91.3                     |
| Series B           | 150.37                   |
| Series C           | 233                      |
| Series D           | 50                       |
| Seed               | 0.55                     |
| Angel              | 0.44                     |
| <b>Grand Total</b> | <b>735.66</b>            |

Source: ABLE Analysis

**Significant Funding in Series C:** The Series C round attracted the highest investment with \$233 million, indicating a phase where companies had likely demonstrated substantial growth and were seeking capital for further expansion or market penetration.

**Balanced Distribution Across Series A and Series B:** The Series A and Series B

rounds showed substantial investments of \$91.3 million and \$150.37 million, respectively. This balanced distribution suggested investor confidence in both early-stage development and subsequent scaling.

**Private Equity Dominance:** Private Equity (PE) was a major contributor, representing a substantial deal amount of \$210 million. PE investments often indicated interest from established investors looking for mature companies with proven business models.

**Seed and Angel Investments:** Seed and Angel rounds had smaller deal amounts, totaling \$0.55 million and \$0.44 million, respectively. These rounds typically involved early-stage startups and served as initial capital to kickstart their operations.

The PE round accounted for the largest share of the total deal amount, at 28.5%. Series C and Series B rounds followed, at 31.8% and 20.4%, respectively. The Seed and Angel rounds accounted for a very small share of the total deal amount, at 0.07% and 0.06%, respectively.

The trends indicated that investors were more willing to invest in later-stage companies, which were more likely to be successful.

Despite the focus on later-stage startups, there were also notable successes in the early-stage realm. For instance, Elucidata raised \$16 million in a Series A round, while Immuneel secured \$15 million in a similar round. These achievements highlighted the continued interest in early-stage startups with promising potential.

Overall, the data painted a positive picture of India’s thriving startup ecosystem. Investors were eager to support startups at various stages, and successful exits were on the rise. This momentum posi-

tioned the Indian startup ecosystem for continued growth in the years to come.

Monthly analysis of investments provided valuable insights into the temporal dynamics of investment activities.

**Peak in February:** February stood out with the highest total investment of \$245.5 million. This could be attributed to strategic planning, annual budget allocations, or specific industry events.

**Consistent Monthly Investments:** While February was a standout month, other months also showed substantial investment activity, contributing to a diverse and consistent funding landscape.

**Seasonal Fluctuations:** The data suggested variations in investment amounts across different months, which might be influenced by seasonal trends, industry cycles, or specific events impacting investor sentiment. May and July, with \$154 million and \$118.94 million, respectively, indicated robust funding during these periods. October and November showed comparatively lower investment amounts at \$6.16 million and \$7.25 million, respectively. This could be due to factors such as year-end financial planning, industry-specific considerations, or other external factors affecting investor behavior.



## INDIA'S BIOTECH UNICORNS: TRAILBLAZING THE FUTURE OF HEALTHCARE

Biocon Biologics and Molbio Diagnostics are both Indian biotechnology companies that have been valued at over \$1 billion, making them latest unicorns.

India's biotechnology sector witnessed a remarkable surge in recent years, with several companies achieving unicorn status – a valuation of over \$1 billion. These biotech unicorns drove innovation and transformed the healthcare landscape, shaping the future of medicine and improving the lives of millions worldwide.

### BIOCON BIOLOGICS: A PIONEER IN BIOLOGICS DEVELOPMENT

Biocon Biologics, a subsidiary of Biocon Limited, was a leading biotech company specializing in the development and manufacturing of biologics, drugs derived from living organisms. With a strong track record of innovation, Biocon Biologics developed several first-in-class biologics, establishing itself as a global leader in the biologics industry. The company's products were utilized in over 70 countries, making a significant impact on healthcare worldwide.

Biocon Biologics secured a total of \$632.4 million in funding over six rounds, demonstrating its strong investor appeal and growth potential. In a major strategic move, the company entered into a revised strategic alliance with Serum Life Sciences (SLSL), a wholly-owned subsidiary of Serum Institute of India (SII). SLSL made an additional equity investment of \$150 million in Biocon Biologics, bringing its total investment to \$300 million. This strategic partnership further strengthened Biocon Biologics' position in the global biologics market.

### MOLBIO DIAGNOSTICS: A UNICORN ON THE RISE

Molbio Diagnostics, a Goa-based health-

care diagnostics firm, emerged as a front-runner in the Indian diagnostic space. The company developed and manufactured a wide range of diagnostic tests for infectious diseases, genetic disorders, and cancer. Molbio Diagnostics' flagship product, Truenat, was a real-time IoT-enabled testing kit that provided rapid and accurate diagnosis for over 40 diseases, including COVID-19, tuberculosis, hepatitis, HIV, HPV, and vector-borne diseases like dengue, chikungunya, and malaria. The Truenat platform was deployed in over 5,000 testing centers across 40 countries worldwide.

Molbio Diagnostics joined the coveted unicorn club after raising \$85 million in a funding round led by Temasek. The company's valuation soared to \$1.53 billion, marking an 8X jump from its previous valuation of \$182.7 million. This milestone made Molbio the second unicorn to emerge from India in September 2022. With this latest funding round, Molbio was well-positioned to achieve its ambitious goal of becoming a billion-dollar revenue company in the next 3-5 years.

**OTHER BIOTECH UNICORNS**

Several other unicorns made significant contributions to biotech advancements and played a pivotal role in shaping the future of the industry.

■ **Anthem Biosciences:** This fully integrated pharmaceutical and biotechnology firm achieved unicorn status following a minority stake acquisition by True North, a private equity fund. Valued at \$1 billion, Anthem Biosciences was poised to make significant contributions in the field of drug discovery and development.

■ **Bharat Biotech:** A leading biotechnology company, Bharat Biotech established itself as a frontrunner in vaccine development. Its Covaxin vaccine for COVID-19 gained widespread recognition and approval for emergency use. Bharat Biotech's unwavering commitment to innovation propelled its growth and solidified its position as a biotech unicorn.

■ **Hetero Labs:** A generic pharmaceutical company and the world's largest producer of anti-retroviral drugs, Hetero Labs made significant strides in the pharmaceutical industry. Its diversified business portfolio, encompassing APIs, generics, biosimilars, custom pharmaceutical services, and branded generics, contributed to its impressive growth and unicorn status.

■ **Intas Pharmaceuticals:** Intas Pharmaceuticals, an independent biotechnology division of Intas Pharmaceuticals Ltd., emerged as an attractive company for investments. The Abu Dhabi Investment Authority (ADIA) agreed to acquire a 3% stake in Intas Pharmaceuticals for \$250-\$270 million. This investment valued Intas Pharmaceuticals at \$8.5 billion. ADIA purchased the stake from existing investor Temasek Holdings. This investment marked a significant development as it attracted a major sovereign wealth fund.

■ **Serum Institute of India:** A renowned biotechnology and pharmaceuticals company, Serum Institute of India held the distinction of being the world's largest vaccine manufacturer. Its Covishield vaccine, approved for emergency use in India,

| Company            | Post Money Value | Total Equity Funding | Lead Investors Include |
|--------------------|------------------|----------------------|------------------------|
| Biocon Biologics   | \$6B             | \$632M               | Serum Life Sciences    |
| Molbio Diagnostics | \$2B             | \$117M               | Temasek Holdings       |

Source: ABLE Analysis





# INNOVATION ECOSYSTEM



# EMPOWERING EMERGING BIOTECH ENTERPRISES

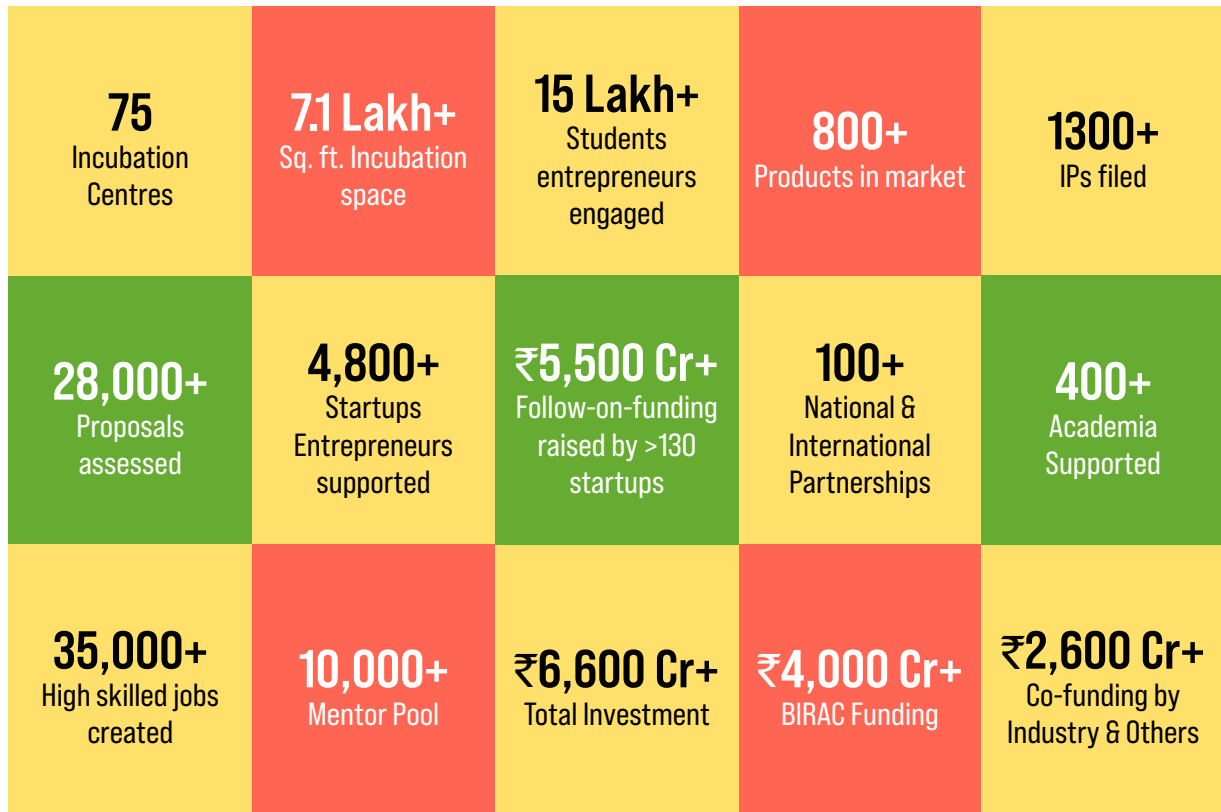
Over the past decade, BIRAC has played a significant role in fostering the growth of the biotech ecosystem.

The Biotechnology Industry Research Assistance Council (BIRAC), established in 2012 as a Section 8, Public Sector Enterprise, has been mandated to fortify and empower emerging Biotech enterprises. The organization has consistently achieved success in promoting, nurturing, and facilitating the Biotech Innovation Ecosystem, aiming to devel-

op globally competitive and affordable products that address the societal needs at large. BIRAC's initiatives span from providing funds for high-risk translational research to supporting nascent ideas, building capacity through the creation of bioincubation centers as shared infrastructure, and providing guidance through mentoring and training. Addi-

# 10+ YEARS OF BIRAC

Nurturing & Strengthening Biotech Innovation Enterprise



Source: ABLE Analysis

tionally, BIRAC actively engages in policy advocacy to empower the biotech ecosystem in India.

Government of India (GoI) policy initiatives, such as "Make in India" and "Startup India," are strategically aligned to position India as a world-class Biotechnology innovation and Bio-manufacturing hub. BIRAC, in response, has been instrumental in nurturing a robust biotech ecosystem capable of effectively addressing the health, food, feed, and fuel needs of the nation. The BioEconomy target for 2025 is set at \$150 billion, with anticipated growth in Bio-pharma, Diagnostics, Medical Devices, and Bio-industrial segments in both consumption and exports.

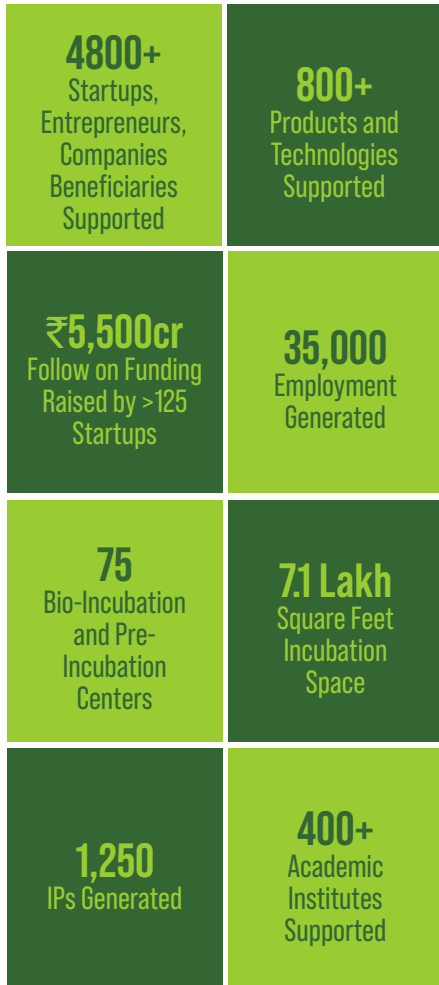
Innovative biotech-based solutions are poised to play a critical role in reducing dependence on non-renewable resources. BIRAC envisions interventions such

as ethanol production from natural resources for fuel blending, the development of bioplastics, biofertilizers, and biopesticides as alternatives to traditional chemicals and pesticides. The biotech innovation ecosystem, largely propelled by startups, has experienced a consistent annual growth in the total number of biotech start-ups, thanks to BIRAC's unwavering support.

The success of the BIRAC model can be attributed to the visionary approach of the Department of Biotechnology (DBT) in promoting innovation and research and development (R&D). BIRAC's programs, schemes, and activities have been meticulously designed to meet the requirements of ecosystem growth. The organization focuses on creating schemes and programs that foster a pipeline of entrepreneurs and startups by providing systematic and value-added support

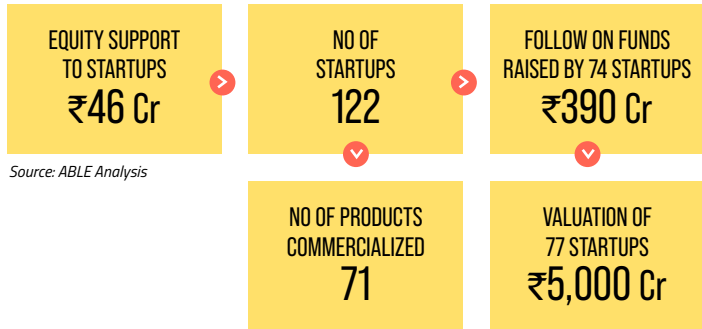


## BIRAC'S IMPACT



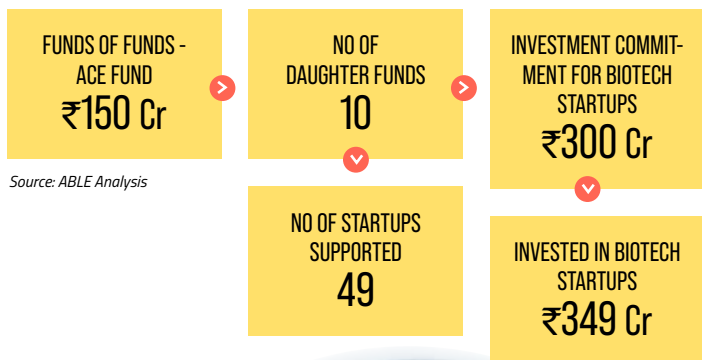
Note Cr denotes Crore. A crore is equal to 10 million

## EQUITY SCHEMES- SEED & LEAP



Source: ABLE Analysis

## FUND OF FUNDS- BIOTECHNOLOGY INNOVATION ACE FUND



Source: ABLE Analysis



during the entire journey, from idea maturation to product commercialization.

Over the past decade, BIRAC has significantly contributed to the growth of the biotech ecosystem, evident in the increasing numbers of applications

received for funding support, a rising count of startups, national and international recognition of Indian startups, and the successful commercialization of Made-in-India products.

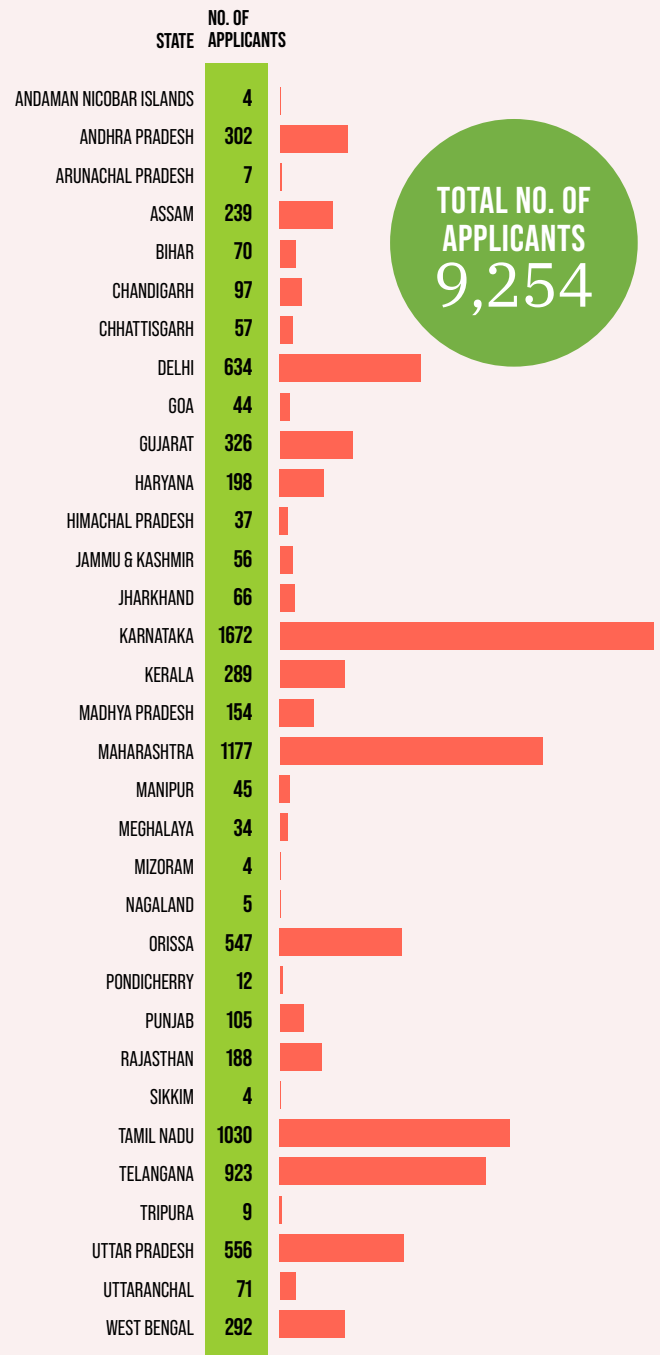
BIRAC has supported over 4800 ben-

eficiaries through various programs, including the BIG program, dedicated to nurturing a pipeline of biotech startups. More than 800 innovative ideas have received support out of 11,000 applications received nationwide. The aspirants, spanning 550+ cities and 38 aspirational districts pan India, are a testament to the extensive reach of BIRAC's initiatives. Early-stage schemes like SITARE and Social Innovation Immersion Program (SIIP) create a robust pipeline of innovators for the BIG scheme. BIRAC's Bioincubation (BioNEST) and pre-incubation (EYUVA) programs have successfully established and supported over 75 bioincubation facilities across the country. These facilities serve as nurturing grounds for nascent ideas by providing access to high-end infrastructure, specialized equipment, business mentorship, intellectual property (IP), legal and regulatory guidance, and networking opportunities. These facilities are strategically located within Universities, Research Institutes, Research Hospitals, or as standalone centers.

**Under the umbrella of i4:** Intensifying the Impact of Industrial Innovation, BIRAC's Small Business Innovation Research Initiative (SBIRI) and Biotechnology Industry Partnership Program (BIPP) Schemes aim to support biotechnological product and technology development by enhancing research and development (R&D) capabilities.

BIRAC's PACE Scheme (Promoting Academic Research Conversion to Enterprise) is designed to nurture translational research within academia. Additionally, equity schemes such as SEED (Sustainable Entrepreneurship and Enterprise Development) Fund, LEAP (Launching Entrepreneurial Driven Affordable Products) Fund, and Biotechnology Innovation (AcE – Accelerating Entrepreneurs) contribute to BIRAC's holistic approach.

## BIG APPLICANT DATA



Source: ABLE Analysis

BIRAC is recognized for its active engagement with biotech startups, incubators, industry, investors, academia, and various stakeholders, including partners. The organization remains committed to shaping and sustaining a dynamic and thriving biotech ecosystem in India.

# THE DYNAMIC LANDSCAPE OF BIOINCUBATORS IN INDIA

## FUELING INNOVATION

India's biotechnology sector is on an upward trajectory, poised to reach a staggering \$150 billion by 2025. This growth is fueled by a robust talent pool, increased investment in research and development (R&D), and a rising demand for innovative healthcare solutions. At the forefront of this surge are bioincubators. These are hubs of innovation that nurture and propel biotech and life sciences startups.

**Historical Perspective:** The evolution of bioincubators in India is a testament to collaborative efforts between the government and private players. The pioneering Society for Innovation and Development (SID), established in 1986 at the Indian Institute of Science, Bengaluru, marked the inception of bioincubators in the country. Since then, a multitude of bioincubators has emerged, fostering an ecosystem conducive to innovation and growth.

**Government Initiatives:** The Department of Biotechnology (DBT) and the Government of India have played pivotal roles in nurturing the biotechnology industry. Across the country, various biotechnology parks and incubators, both governmental and private, aim to propel emerging biotech startups locally and onto the global stage. Pro-bioincubator policies, such as the Biotechnology Industry Partnership Programme (BIPP) and the Biotechnology Ignition Grant (BIG), provide crucial support for incubation and early-stage development.

**Private Sector Contributions:** Corporate giants like Reliance, TATA, and Biocon have significantly contributed to advancing bioincubators. Private bioincubators offer startups access to finance, mentorship, networking opportunities, and essential facilities. Institutions like the Centre for Cellular and Molecular Platforms (C-CAMP) in Bengaluru have played a pivotal role in promoting innovation in the life sciences industry.

**Performance Indicators:** The success of bioincubators is measured through various indicators, including the number of startups incubated, jobs created, investment raised, and the success rate of startups. Over time, India's bioincubators have witnessed a substantial increase in their ability to support startups, with more than 200 biotech firms incubated across the country.

**Employment Generation:** Bioincubators in India have played a crucial role in generating both direct and indirect employment. Direct employment within incubated startups includes roles such as scientists, engineers, technicians, and administrative personnel. Indirect employment extends to jobs created by vendors, suppliers, and service providers collaborating with these startups. The

biotechnology industry, including bioincubators, generated over 600,000 direct jobs and more than 1.5 million indirect jobs.

**Success Stories:** Several success stories have emerged from India's bioincubators, contributing significantly to job creation. Companies like MyLab Discovery Solutions and MolBio Diagnostics nurtured by BIRAC-funded bioincubators, have not only created hundreds of jobs but have also raised substantial funding.

**The Current Biotech Landscape:** The biotech industry in India experienced remarkable growth in 2022, with over 1,390 new startup registrations in a single year. The Government support, spearheaded by Prime Minister Narendra Modi, has played a crucial role in fostering the exponential increase in biotech startups, with a goal to surpass 10,000 startups by 2025.

**Bioincubation Challenges and Initiatives:** The burgeoning growth in biotech startups necessitates the development of world-class bioincubation spaces. The Department of Biotechnology has been proactive in establishing biotechnology parks and bioincubators across the country to support the transformation of research into products and services. Notable examples include IKP Knowledge Park in Hyderabad, Golden Jubilee Biotech Park for Women in Chennai, and C-CAMP in Bengaluru.

**Regional Examples and Key Players:** Various bioincubators and biotech parks have been established in different regions, including Hyderabad, Chennai, Bengaluru, Pune, Vadodara, and Odisha. Key players such as IKP Knowledge Park, C-CAMP, and KIIT Technology Business Incubator have been instrumental in fostering the growth of biotech startups.

## IN-DEPTH INSIGHTS INTO SELECTED INCUBATORS

Bioincubators have not only shaped the biotech startup ecosystem in India but have also been recognized for their achievements in various categories. Here are a few examples

**Diverse Geographical Presence:** Bioincubators and biotech parks have sprouted across various regions, exemplifying the widespread growth of the biotechnology sector. Notable locations include Hyderabad, Chennai, Bengaluru, Pune, Vadodara, and Odisha.

**Collaborative Backing from Public and Private Sectors:** The establishment and sustenance of bioincubators and biotech parks draw support from both public and private sectors. Noteworthy achievements are meticulously profiled and ranked based on their performance during the fiscal year 2021-22.

### DIVERSE GEOGRAPHICAL PRESENCE

#### HYDERABAD:

- IKP Knowledge Park
- Bio-incubator at the University of Hyderabad
- Atal Incubation Centre (AIC)

#### CHENNAI:

- Golden Jubilee Biotech Park for Women
- Crescent Innovation and Incubation Council in Chennai

#### BENGALURU:

- Centre for Cellular and Molecular Platforms (C-CAMP)

- Bangalore Bioinnovation Centre (BBC)

#### PUNE:

- Venture Center

#### GUJARAT:

- Biotechnology Park at Savli Industrial Estate

#### ODISHA:

- KIIT Technology Business Incubator (KIIT-TBI)



## ACHIEVEMENTS OF SELECTED INCUBATORS

### IKP KNOWLEDGE PARK (IKP):

**Establishment:** Founded in 1999 as India's first wet lab research park.

**Mission:** Aims to create a world-class ecosystem for fostering innovation and increasing competitiveness in India and the region.

**Foundation:** Initiated by ICICI Bank and the State Government of Andhra Pradesh.

**Evolution:** Started with modular lab spaces, expanded to house multinational companies (MNCs) by 2004.

**Success Stories:** Matrix Laboratories and GVK Biosciences notable for significant growth.

**Expansion:** Tripled lab space by 2004 and introduced the International Knowledge Millennium Conference (IKMC) in 2002.

**Life Science Incubator:** Started in 2006, the first private incubator supported by NSTEDB, DST.

**Awards:** ABLE awarded IKP as the Best Biotech Park in India in 2012.

**IKP 2.0:** Mission revisited in 2019, focusing on advancing deep tech and co-creating solutions.

**Impact and Reach:** Supports 1,500+ innovators, startups, and large companies across 90+ cities. Investment multiplier noted as 30x.

**Initiatives:** IKP Policy Centre – CANVAS, One Health Incubator, Digital Health Accelerator - DEEP, Virtual Infrastructure Platform – Athena, and IKP Global Regulatory Forum (IGRF).



### BANGALORE BIOINNOVATION CENTRE (BBC):

**Formation:** A not-for-profit promoted by Karnataka Innovation and Technology Society (KITS) and the Department of Biotechnology, Government of India.

**Facilities:** Achieved 100% occupancy with full-fledged Central Instrumentation Facility (CIF).

**Startup Products:** Notable products include a remote fetal monitoring device, PCR detection mixes, herbal supplements against COVID-19.

**Mentorship:** Provides mentorship on technical, IP, regulatory, investor connections, and commercialization.

**Networking:** Sponsors delegations to global events and collaborates with academic and non-academic organizations.

**Awards:** Received various awards, including Top Innovation Enabler and Top Bio-incubator.

**Government Grants:** Approved grants under the RKVY scheme and sanctioned \$1.2 million for pandemic preparedness.

**Education Programs:** Initiatives like DST's TEDP and Clinical Research and Development Course.





### CENTER FOR CELLULAR AND MOLECULAR PLATFORMS (C-CAMP):

**Establishment:** Founded in 2009 by the Department of Biotechnology (DBT), Government of India.

**Role:** Serves as a platform technology base, industry-oriented innovation hub, and startup ecosystem.

**Achievements:** Completed 4,250+ projects, contributed to the biosciences industry with over 230 publications.

**Entrepreneurship Ecosystem:** Provides funding, incubation, mentorship, and accelerator programs for startups.

**Focus Domains:** Key domains include Agriculture, Medtech, Diagnostics, Anti-microbial Resistance, Digital Health.

**Global Partnerships:** Forged partnerships with major innovation centers globally and collaborations with organizations like QB3, CARB-X, Rockefeller Foundation.

**Recognition:** Received National Awards from various Government of India organizations.



### VENTURE CENTER:

**Overview:** A national-award-winning, non-profit technology business incubator hosted by CSIR-National Chemical Laboratory in Pune.

**Collaborations:** Works closely with government ministries and has over 70 resident startups at any time.

**Awards:** Received National Awards and recognition for thought leadership and operational excellence.

**Facilities:** Offers scientific and prototyping facilities, including specialized labs and ISO 13485 certified MedTech Cleanroom.

**Impact:** Supported 700+ startups with contributions to health, agriculture, energy, environment, digitalization, and automation sectors.





**GOLDEN JUBILEE BIOTECH PARK FOR WOMEN SOCIETY:**

**Inauguration:** Established in 2001 in Siruseri, Chennai, with a commitment to empowering women entrepreneurs.

**Leadership:** Governed by a commercial team led by Prof. PM Murali, with 150 years of cumulative corporate experience.

**Empowerment:** Focus on supporting women entrepreneurs from R&D to commercialization, with 20 unit modules having 100% occupancy.

**Recognition:** Received awards, BIRAC seed fund, and Startup India seed fund. Actively associated with entrepreneurship development and innovation initiatives.

**BioNest Bioincubation Centre:** Inaugurated in 2017, supporting aspiring women entrepreneurs.



**KIIT TECHNOLOGY BUSINESS INCUBATOR (TBI):**

**Formation:** Established in 2009 at KIIT University, Odisha, supported by various government bodies and industries.

**Nurturing:** Enabled the creation of over 5,000 technical jobs, on-boarded 50+ industries, and promoted 200+ manufacturing startups.

**Regional Techno-entrepreneurship Centre:** Established a BIRAC Regional Techno-entrepreneurship Centre (BRTC).

**Awards:** Recognized with the National Award for Technology Business Incubation and National IPR Award.

**International Collaboration:** Building international collaborations and anchoring the Bhubaneswar City Knowledge Innovation Cluster Foundation.



### TCG INTERNATIONAL BIOTECH PARK (TCG IBP):

**Location:** Situated on the Mumbai-Pune knowledge corridor, incorporated in 2003 as a public-private partnership.

**Focus Areas:** Dedicated to the Life Sciences industry, particularly in R&D, with thrust areas in biotechnology and pharmaceuticals.

**Integrated Biotech Park:** Spans 80 acres, providing space for R&D and including residential, commercial, and hotel facilities.

**Notable Tenants:** Hosts companies like Emcure Pharmaceuticals, Gennova Biopharmaceuticals, Hikal Ltd, Omni Active Technologies, and more.

**Infrastructure:** Offers premises ready for fit-outs, lab spaces, and biotech land. Infrastructure includes wide roads, an electrical substation, 100% power backup, and effluent treatment plants.

## NEW BIOCLUSTERS

The Department of Biotechnology in India has implemented a strategic initiative to enhance collaboration and networking in the biotech sector through the establishment of Bioclusters. Currently, four Bioclusters are operational in India -- Faridabad (Haryana), Bangalore (Karnataka), Kalyani (West Bengal), and Pune (Maharashtra). Under this program, notable achievements include the creation of advanced facilities like the National Structural Biology Facility with an Electron Cryo-microscope, an Advanced Technology Platform Centre with a Bioincubator, and a system medicine platform for generating biological and medical evidence.

**NCR Biotech Science Cluster in Faridabad:** The NCR Biotech Science Cluster in Faridabad, an ambitious project spanning 200 acres, aims to position Faridabad as a global biotechnology hub. It is a collaborative effort involving five partner institutions of national importance, including the National Institute of Immunology (NII), Regional Centre for Biotechnology (RCB), Translational Health Sciences and Technology Institute (C), National Brain Research Centre (NBRC), and National Institute for Plant Genome Research (NIPGR). The cluster features shared facilities such as laboratories, pilot facilities, clinical research and data management centers, animal houses, instrumentation facilities, and an incubation center for innovative start-ups. The Office of Connectivity has been conceptualized as the cluster office for the NCR Biotech Science Cluster and is responsible to establish a governance structure for the management and utilization of common facilities.

**System Medicine Cluster (SyMeC), Kalyani, West Bengal:** The System Medicine Cluster (SyMeC) in Kalyani, West Bengal, is a collaborative initiative involving six

national institutions and one clinical center in Kolkata. Key members include the National Institute of Biomedical Genomics (NIBMG), Indian Statistical Institute (ISI), Bose Institute (BI), CSIR-Indian Institute of Chemical Biology (IICB), Tata Medical Centre (TMC), and Indian Institute of Science Education and Research (IISER). The targets of this biocluster were to provide improved genomic signatures for prediction of progression, recurrence and failure of standard treatment for improved management of oral and cervical clusters; identify actionable targets on biological pathways and peptides/small-molecules to interact with some of the targets; and create a platform for multi-disciplinary training to build a cadre of scientific, clinical and technical personnel required to drive and to sustain systems medicine. The SyMeC biocluster has successfully developed a biological molecule (peptide) to block the adverse impact of a DNA change in a key cancer gene (TP53), identified known drugs that can reverse the direction of dysregulation of some important cancer-causing genes caused by epigenetic effects, and identified five genomic features that can predict the spread of oral cancer (metastasis) to other organs with a high accuracy.

**Pune Biotech Cluster - “Model Organisms to Human Disease”:** DBT supports the establishment of the Pune Biotech Cluster, focusing on “Model Organisms to Human Disease” at the National Centre for Cell Science (NCCS) and Indian Institute of Science Education and Research (IISER) in Pune. The goal is to develop technology platforms for detailed molecular analyses leading to pathogenesis, utilize model organisms to address problems in human disease biology, promote lab-to-bed translational research.

**Bangalore Biocluster:** The Bangalore Biocluster is the fourth biocluster estab-

## TOP 15 INCUBATORS

- KIIT Technology Business Incubator (TBI), Bhubaneswar
- Centre for Cellular and Molecular Platforms (C-CAMP), Bengaluru
- Entrepreneurship Development Center (Venture Center), Pune
- Life Science Incubator - IKP Knowledge Park, Hyderabad
- Crescent Innovation & Incubation Council (CIIC), Chennai
- Bangalore Bioinnovation Centre (BBC), Bengaluru
- Startup Incubation and Innovation Centre (SIIC), IIT Kanpur
- Atal Incubation Centre - Centre for Cellular and Molecular Biology (AIC-CCMB), Hyderabad
- Technology Incubation Centre, Guwahati Biotech Park, Guwahati
- BITS Goa Innovation Incubation & Entrepreneurship Society (BGIIES) – BITS BIRAC BioNEST, Goa
- Aspire-BioNEST, Hyderabad
- Savli Technology & Business Incubator (STBI), Vadodara
- Manipal - Government of Karnataka (GoK) Bioincubator, Manipal, Karnataka
- Golden Jubilee Biotech Park for Women Society – MS Swaminathan Bioincubation Centre, Chennai
- Indian Institute of Technology, Madras (IITM) Bioincubator, Chennai

lished by the DBT. This in South and it is to promote innovation and entrepreneurship in the biotechnology sector. The Bangalore Biocluster is located in the campus of the National Centre for Biological Sciences (NCBS) in Bengaluru. It comprises three institutions The Centre for Cellular and Molecular Plat-

forms (C-CAMP), The Institute for Stem Cell Science and Regenerative Medicine (InStem), and The National Centre for Biological Sciences (NCBS). The objectives of the Bangalore Biocluster are to promote collaboration and networking among researchers in the biotechnology sector, facilitate the translation of basic research into commercial products, and

create a supportive environment for the growth of biotechnology startups. The Bangalore Biocluster has made significant contributions to the growth of the biotechnology sector in India. Some of its key achievements include incubation of over 100 biotechnology startups and raising of over Rs 500 crore (\$60 million) in funding for biotechnology startups.

## BIOTECHNOLOGY PARKS

The DBT has established 11 Biotechnology Parks/Incubators across India to translate research into commercial products and services. These parks support scientists and Small & Medium-sized Enterprises (SMEs) in technology incubation, demonstration, and pilot plant studies. Notable parks include Biotech Park in Lucknow, Guwahati Biotech Park, KRIBS BioNest in Kochi, Industrial Biotechnology Parks in Jammu & Kashmir, Chhattisgarh Biotech Park, and Biopharma Growth Phase Park in Hyderabad.

### BIOTECH PARKS

- Biotech Park, Lucknow, Uttar Pradesh
- Biotechnology Incubation Centre, Hyderabad, Telangana
- Tidco Centre For Life Sciences (TICEL) Biotech Park, Chennai, Tamil Nadu
- The Golden Jubilee Biotech Park For Women, Chennai, Tamil Nadu
- Biotech Park Technology Incubation Centre, Guwahati, Assam
- Biotechnology Incubation Centre, Cochin, Kerala
- Biotechnology Park, Bangalore, Karnataka
- Two Industrial Biotechnology Parks (IBTPs), Jammu & Kashmir
- Chhattisgarh Biotech Park, Naya Raipur, Chhattisgarh
- Biopharma Growth Phase park and a common Scale up manufacturing facility with training provision in Genome Valley, Hyderabad
- KRIBS BioNest, Kochi, Kerala

## ACHIEVEMENTS OF ONGOING PROJECTS

**Biotech Park, Lucknow:** Focused on bio-pharma, agri-biotechnology, and bio-services. Actively expanding facilities, supporting 12 incubatees, and strengthening HRD programs.

**Guwahati Biotech Park:** Inaugurated a new Technology Incubation Centre (TIC), supporting entrepreneurs/startups, hosting talent search contests, and organizing the Assam Biotech Conclave.

**KRIBS BioNest, Kochi:** Provides infrastructure and support for researchers, investors, and entrepreneurs. Has 29 physical incubatees and 9 virtual incubatees, contributing to employment and industry projects.

**Industrial Biotechnology Parks in Jammu & Kashmir:** Two parks established to boost bio-enterprise development and employment. Inauguration of the Indus-

trial Biotechnology Park at Kathua, Jammu, in May 2022.

**Chhattisgarh Biotech Park:** Facilitates collaboration between research institutes and industries for bioresource-based product commercialization. Two-phase project involving a Biotech Incubation Centre and Business Enterprise Zone.

**Biopharma Growth Phase Park in Hyderabad:** Envisaged as a state-of-the-art scale-up manufacturing facility offering R&D lab suites. Aiming to support early-stage companies and create employment in the life sciences sector. B-Hub is designed as a showcase project for the Government of Telangana, contributing to the vision for biopharma innovation in India and potential employment generation in the life sciences sector.

## MAKE-IN-INDIA & STARTUP INDIA PROGRAMS

DBT has actively participated in the Make in India 1.0 and Startup India programs, establishing the Make in India Facilitation Cell at the Biotechnology Industry Research Assistance Council (BIRAC). The Make in India Cell, initially set up for three years, has been extended to 2026. Key achievements include significant growth in startups, bio-incubators, regional centers, bio-connect offices, and products in the market.

### SUPPORTING STARTUPS FOR PROGRESSION TO COMMERCIALIZATION:

**International Showcasing:** 15 startups were supported for national and international showcasing.

**Product Launch Platform:** Recognized 75+ startup products during the 75th year of independence.

**Biotech Showcase e-Portal:** Launched with 750+ products and technologies from BIRAC-supported startups, inaugurated by the Prime Minister during Biotech Startup Expo 2022.

**Startups Raising Follow-on Funding:** 32 startups raised Rs 1000+ crore (\$120 million) as follow-on funding, contributing to a cumulative total of Rs 5,500+ crore (\$660 million) raised by 130+ startups.

The efforts of the Make in India Cell have significantly nurtured and strengthened innovation and enterprise in the biotechnology sector.

Bioincubators in India have evolved into critical players, fostering innovation and

entrepreneurship in the biotechnology industry. The collaborative efforts of the government, private sector, and various stakeholders have created a thriving ecosystem, contributing to the growth of biotech startups, job creation, and substantial funding. As India continues its progressive journey, bioincubators remain instrumental in shaping the future of the biotechnology landscape.

## STARTUP INDIA ACTION PLAN ACHIEVEMENTS

NUMBER OF STARTUPS:  
**Increased from 1022 (Aug 2016) to 6755 (Dec 2022)**

|   |   |
|---|---|
| BIO-INCUBATORS<br><b>Grew from 20 to 75</b> | REGIONAL CENTERS<br><b>Expanded from 2 to 4</b> |
|---|---|

BIO-CONNECT OFFICES  
**Established 5**

STARTUP PRODUCTS IN THE MARKET  
**Rose from 7 to 800+**

TECHNOLOGY TRANSFER OFFICES (TTOS)  
**Grew from 0 to 7**





# BIOTECH PRODUCTS



## NEW PRODUCT RELEASES

# PRODUCTS LAUNCHED IN 2022

The year witnessed the introduction of nearly 50 products in the broad life sciences and healthcare segment.



## DISTRIBUTION ACROSS SECTORS:

- Diagnostics:** Representing 25% of the total trends, there was a significant focus on advancements and innovations in diagnostic technologies within the healthcare industry.
- Medical Devices:** Constituting the highest share at 35% of the total trends, there was a substantial emphasis on the development and introduction of new medical devices, ranging from imaging equipment to innovative surgical tools.
- Therapeutics:** Similar to Medical Devices, Therapeutics also constituted 35% of the total trends, highlighting a strong focus on advancements in therapeutic treatments, including pharmaceuticals and other medical interventions.
- Vaccines:** Vaccines represented 4% of the total trends, indicating ongoing efforts and innovations in the development of vaccines for various diseases.

## HERE ARE FEW PRODUCT RELEASES

### INNACCEL TECHNOLOGIES AND C-CAMP RESPIRATORY SUPPORT TECHNOLOGY:

DATE: SEPTEMBER 20, 2022

Summary: InnAccel Technologies, C-CAMP, and SAMRIDH Healthcare Blended Finance Facility partnered to introduce SAANS, an indigenous CPAP system for newborns in Assam. This technology aims to reduce neonatal mortality due to Respiratory Distress Syndrome (RDS) by providing respiratory support during transport and in hospital settings.

### CERVAVAC - INDIA'S FIRST CERVICAL CANCER VACCINE:

DATE: SEPTEMBER 1, 2022

Summary: India launched CERVAVAC, its first indigenously developed quadrivalent Human Papilloma Virus (HPV) vaccine for preventing cervical cancer. Developed through collaboration between DBT, BIRAC, Serum Institute of India, and the Bill and Melinda Gates Foundation, the

vaccine is a significant step towards PM Modi's vision of Atmanirbhar Bharat.



#### **MYLAB'S TB DETECTION KIT AND COVISWIFT:**

**DATE: NOVEMBER 30, 2022 (TB DETECTION KIT) JANUARY 2022 (COVISWIFT)**

Summary: Mylab received approval for its Made in India TB Detection kit (PathoDetect™ MTB RIF and INH) that detects tuberculosis and drug resistance. Additionally, Mylab launched CoviSwift, a high-throughput Point of Care Testing Solution for COVID-19, processing 16 samples in 40 minutes with high accuracy.



#### **MELTS EYE CARE BY WELLBEING NUTRITION:**

**DATE: APRIL 16, 2022**

Summary: Wellbeing Nutrition launched 'Melts Eye Care,' the world's first all-natural eye vitamins using advanced nano technology. The product protects eyes from damage, strain, fatigue, and blue light irritation. It was introduced in several markets, including India, the USA, UK, Singapore, and the UAE.



#### **BAYER'S CANESTEN ANTIFUNGAL RELAUNCH:**

**DATE: MAY 11, 2022**

Summary: Bayer relaunched Canesten, its antifungal brand, in India. The range includes powder and cream formats, offering anti-fungal properties for preventing and treating skin infections, such as ringworm, jock itch, and fungal nail infections.

#### **TAKEDA'S ADYNOVATE FOR HAEMOPHILIA PATIENTS:**

**DATE: MAY 17, 2022**

Summary: Takeda introduced Adynovate, an extended half-life recombinant Factor VIII treatment, for haemophilia A patients in India. The therapy, in combination with Mypkfit, offers personalized

prophylaxis treatment with real-time monitoring, enhancing patient outcomes.



#### **BAYER'S VERQUVO FOR HEART FAILURE:**

**DATE: SEPTEMBER 27, 2022**

Summary: Bayer launched Verquvo (vericiguat), a soluble guanylate cyclase stimulator, in India for adults with symptomatic chronic heart failure. Verquvo reduces the risk of cardiovascular death and heart failure hospitalization, addressing the substantial burden of heart failure in India.

#### **BAYER'S KERENDIA FOR CKD IN DIABETES PATIENTS:**

**DATE: AUGUST 26, 2022**

Summary: Bayer launched Finerenone (Kerendia) in India for treating chronic kidney disease (CKD) associated with type 2 diabetes. The first-in-class non-steroidal mineralocorticoid receptor antagonist reduces the risk of sustained eGFR decline, cardiovascular death, and other outcomes.

#### **SUGMADEX BY BDR PHARMA AND VARENYAM HEALTHCARE:**

**DATE: MAY 31, 2022**

Summary: BDR Pharma and Varenym Healthcare launched Sugmadex, a novel anaesthetic drug with cyclodextrin neuromuscular block reversal properties. Sugmadex offers safe and complete reversal of neuromuscular block, addressing challenges in anaesthetic practice.

#### **GLENMARK'S LOBEGELITAZONE FOR TYPE 2 DIABETES:**

**DATE: OCTOBER 6, 2022**

Summary: Glenmark Pharmaceuticals launched Lobeglitazone (LOBG) in India, a thiazolidinedione for treating type 2 diabetes in adults. The drug, with high efficacy in managing insulin-resistant diabetes prevalent in India, provides improved glycaemic control.



### ELI LILLY'S RAMIVEN FOR HIGH-RISK EARLY BREAST CANCER:

DATE: NOVEMBER 25, 2022

Summary: Eli Lilly launched Ramiven (abemaciclib) in India, gaining approval for adjuvant treatment in high-risk early breast cancer patients. The CDK 46 inhibitor offers a significant advancement in treating breast cancer, aiming to reduce recurrence.

### CINRYZE BY TAKEDA FOR HEREDITARY ANGIOEDEMA:

DATE: DECEMBER 14, 2022

Summary: Takeda launched Cinryze in India, an injectable prescription medicine for prophylaxis in hereditary angioedema (HAE) patients. Cinryze, a C1 esterase inhibitor, marks a breakthrough in episodic and long-term prophylaxis for HAE.

### CADILA PHARMA'S LAGLO SOFT LOTION FOR DRY SKIN:

DATE: FEBRUARY 4, 2022

Summary: Cadila Pharma launched Laglo Soft Lotion, an intensely moisturizing formula treating dry skin conditions. The lotion, based on 3D Aquaporin Hydra-concept, enhances moisturization and restructures the skin.

### IMMUNIGY BY LAY SCIENCES - COVID-19 NEUTRALIZING ANTIBODY MOUTHWASH:

DATE: FEBRUARY 7, 2022

Summary: Lay Sciences launched Immunigy, a COVID-19 neutralizing antibody mouthwash derived from hyperimmunized chicken eggs. It effectively targets the SARS-CoV-2 virus and received approval in Europe.



### GLENMARK'S FABISPRAY NITRIC OXIDE NASAL SPRAY FOR COVID-19:

DATE: FEBRUARY 9, 2022

Summary: Glenmark

Pharmaceuticals and SaNOtize launched FabiSpray, a nitric oxide nasal spray for treating adult COVID-19 patients at high risk of disease progression. The spray prevents viral incubation in the upper airways.

### ZARBOT BY GUFIC BIOSCIENCES - INDIA'S FIRST INDIGENOUS BOTULINUM TOXIN INJECTION:

DATE: DECEMBER 30, 2022

Summary: Gufic Biosciences introduced Zarbot, India's first indigenously produced Botulinum Toxin Type A injection. Developed in collaboration with Prime Bio, Zarbot offers a stable and effective solution for treating neurological conditions.

### STRYKER'S NEUROVASCULAR R&D LAB FOR STROKE CARE INNOVATION:

DATE: DECEMBER 7, 2022

Summary: Stryker opened a Neurovascular lab in India focused on accelerating stroke-related innovation in the Asia Pacific. The lab facilitates collaboration between stakeholders, aiming to improve stroke care and patient outcomes.



### TATA 1MG'S DRONE DELIVERY FOR SAMPLE COLLECTION & MEDICINES:

DATE: ONGOING

Summary: Tata 1mg initiated a drone service pilot in Dehradun for faster diagnostic sample collection and medicine delivery, addressing delays caused by road traffic. The drones are equipped to

carry payloads and maintain temperature control throughout the transportation supply chain.

#### **FREUDENBERG MEDICAL'S HELIXFLEX TPE TUBING:**

**DATE: NOVEMBER 30, 2022**

Summary: Freudenberg Medical launched HelixFlex, a high-purity TPE tubing for biopharmaceutical fluid transfer applications. It offers advantages like easy welding to existing tubing lines, heat-sealing for fast fluid transport, various sterilization options, and environmental friendliness compared to silicone.



#### **LUMIRADX'S CRP POINT OF CARE ANTIGEN TEST:**

**DATE: NOVEMBER 25, 2022**

Summary: LumiraDX Healthcare introduced a CRP point-of-care antigen test in India to aid in reducing unnecessary antibiotic prescribing and combat antimicrobial resistance. The test provides results within four minutes, contributing to World Antimicrobial Awareness Week.

#### **AVAY BIOSCIENCES' MITO PLUS BIO 3D PRINTER:**

**DATE: NOVEMBER 19, 2022**

Summary: Indian startup Avay Biosciences launched 'Mito Plus,' an advanced Bio 3D Printer capable of printing human tissues. Developed in collaboration with the Indian Institute of Science, it utilizes bioprinting technology with engineered bioinks.

#### **ROCHE DIAGNOSTICS' AUTOMATED CEREBROSPINAL FLUID-BASED TEST FOR ALZHEIMER'S:**

**DATE: NOVEMBER 16, 2022**

Summary: Roche Diagnostics India introduced Elecsys AD CSF assays for automated cerebrospinal fluid-based tests to aid in the early diagnosis and risk assessment of Alzheimer's disease. The assays are available at top neurological institutes in India.

#### **MEDTRONIC'S TRUCLEAR & HYSTEROLUX SYSTEM FOR HYSTEROSCOPY:**

**DATE: NOVEMBER 2, 2022**

Summary: Medtronic launched the TruClear system for diagnostic and operative hysteroscopy, addressing intrauterine abnormalities causing abnormal uterine bleeding. The system is designed to be safe and effective for treating conditions like fibroids and polyps.

#### **EVER PHARMA'S APOMORPHINE THERAPY DEVICES FOR PARKINSON'S:**

**DATE: MARCH 5, 2022**

Summary: Celera Neuro Sciences launched advanced apomorphine pumps and pens for Parkinson's patients in India. The third-generation D-mine apomorphine pumps offer self-handling capability and electronic control for safe and convenient administration.



#### **MANKIND PHARMA'S RAPID TESTING PREGNANCY DEVICE:**

**DATE: APRIL 13, 2022**

Summary: Prega News, Mankind Pharma's pregnancy test kit brand, launched Prega News Advance, a single-step pregnancy test device for home use. The device is easy to use, requiring no dropper, and provides results in just three minutes.



#### **CADILA PHARMACEUTICALS' THREE-DOSE RABIES VACCINE THRABIS:**

**DATE: APRIL 8, 2022**

Summary: Cadila Pharmaceuticals launched ThRabis, a novel three-dose rabies vaccine using Virus-Like Particle technology. The vaccine aims to prevent rabies by generating antibodies against the rabies G protein.





### ROCHE PHARMA'S PHESGO FOR HER-2 POSITIVE BREAST CANCER:

DATE: MAY 12, 2022

Summary: Roche Pharma introduced PHESGO, a fixed-dose formulation combining Perjeta and Herceptin monoclonal antibodies with hyaluronidase for subcutaneous administration. The therapy targets early and metastatic HER2-positive breast cancer.

### ZYDUS LIFESCIENCES' BEMDAC FOR UNCONTROLLED LDL-CHOLESTEROL:

DATE: MAY 16, 2022

Summary: Zydus Lifesciences launched Bemdac, a new drug for patients with uncontrolled LDL-Cholesterol despite lifestyle modifications and statin use. The oral drug provides a new treatment option for managing dyslipidemia.

### CADILA PHARMACEUTICALS' CHOLESTEROL DRUG BELMORE:

DATE: MAY 25, 2022

Summary: Cadila Pharmaceuticals launched Belmore, a novel drug for treating high LDL cholesterol. Bempezoic acid, the active ingredient, offers a unique approach to managing bad cholesterol levels.

### AVESTHAGEN AND WIPRO'S GENETIC TESTS FOR CANCERS:

DATE: JUNE 20, 2022

Summary: Avesthagen partnered with Wipro to commercialize genetic testing services, starting with the CALiBRxO 624 gene panel for cancers and neurological conditions. The collaboration aims to bring genome-led medicine to super specialty clinics and hospitals.

### BASF AND PERMIONICS' HIGH-PERFORMANCE FACE MASKS:

DATE: JULY 4, 2022

Summary: BASF and Permionics introduced face masks using Ultrason E polyethersulphone polymer for the middle

layer. These masks are highly breathable, washable, and reusable, offering a unique solution for the Indian healthcare market.



### GODREJ INSULICOOL FOR INSULIN STORAGE:

DATE: JULY 12, 2022

Summary: Godrej Appliances launched InsuliCool, an innovative cooling solution for insulin storage. The product maintains recommended temperatures, addressing challenges faced by diabetic patients, and has broader applications for storing temperature-sensitive medical items.

### OMRON HEALTHCARE'S MEDICAL MOLECULAR SIEVE OXYGEN CONCENTRATOR:

DATE: JULY 6, 2022

Summary: OMRON Healthcare introduced a portable oxygen concentrator based on medical molecular sieve technology. The device provides a continuous supply of high-purity oxygen, making it suitable for homecare providers managing patients with COPD and respiratory problems.



### GOQII'S SMART VITAL ULTRA AND GOQII STREAM:

DATE: AUGUST 3, 2022

Summary: GOQii expanded its preventive healthcare portfolio with Smart Vital Ultra and GOQii Stream devices targeting young adults. The Smart Vital Ultra offers features like blood oxygen monitoring, continuous heart rate monitoring,

and sleep pattern analysis. GOQii is also moving towards a health metaverse with blockchain tokens and gamification.

#### **ROCHE PHARMA INDIA'S PATIENT SUPPORT APP - THE BLUE TREE 2.0:**

**DATE: NOVEMBER 29, 2022**

Summary: Roche Pharma India launched The Blue Tree 2.0 mobile app, enhancing the patient support program experience. The app facilitates easy access to patient support services, including enrollment tracking, drug assistance requests, and delivery services, improving overall patient and healthcare professional experiences.

#### **APOLLO HOSPITALS' AUTOMATED RAPID-RESPONSE PATIENT MONITORING SYSTEM:**

**DATE: OCTOBER 12, 2022**

Summary: Apollo Hospitals introduced an indigenously developed automated patient monitoring system. The system, developed by HealthNet Global, uses advanced medical devices and wearables to monitor patients continuously, providing early warning alerts to ensure timely intervention and improved patient outcomes. Apollo is planning to expand this system across its network of hospitals with a significant investment.

#### **FREUDENBERG MEDICAL - HELIXFLEX TPE TUBING:**

**DATE: NOVEMBER 30, 2022**

Summary: Freudenberg Medical launched HelixFlex, a high-purity thermoplastic elastomer (TPE) tubing for biopharmaceutical fluid transfer. It offers fast and safe fluid transport in biopharma processes and is an environmentally friendly alternative to silicone, with various sterilization options.

#### **LUMIRADX - CRP POINT OF CARE ANTIGEN TEST:**

**DATE: NOVEMBER 25, 2022**

Summary: LumiraDX Healthcare launched a C-Reactive Protein (CRP) point-of-care antigen test in India to reduce unnecessary antibiotic prescrib-

ing, addressing antimicrobial resistance. The rapid test provides results in four minutes and aids in managing patient compliance to mitigate the global burden of drug-resistant pathogens.

#### **AVAY BIOSCIENCES - MITO PLUS BIO 3D PRINTER:**

**DATE: NOVEMBER 19, 2022**

Summary: Avay Biosciences launched 'Mito Plus,' an indigenous Bio 3D Printer capable of printing human tissues. The printer utilizes bioprinting technology, supporting tissue replication for applications in regenerative medicine and biomedical research.

#### **ROCHE DIAGNOSTICS - AUTOMATED CSF-BASED TEST FOR ALZHEIMER'S:**

**DATE: NOVEMBER 16, 2022**

Summary: Roche Diagnostics India introduced Elecsys assays for cerebrospinal fluid-based testing to aid in the early diagnosis of Alzheimer's disease. The tests are intended for patients with cognitive impairment and aim to improve the accuracy of AD diagnosis, enabling clinicians to evaluate disease progression.

#### **MEDTRONIC - TRUCLEAR & HYSTEROLUX SYSTEM:**

**DATE: NOVEMBER 2, 2022**

Summary: Medtronic launched the TruClear system, a mechanical hysteroscopic tissue removal system, for the safe and effective treatment of intrauterine abnormalities. The system addresses abnormal uterine bleeding, a symptom reported by 9-14% of women in India.

#### **EVER PHARMA - APOMORPHINE THERAPY DEVICES FOR PARKINSON'S:**

**DATE: MARCH 5, 2022**

Summary: German pharma company Ever Pharma introduced advanced apomorphine pumps and pens for Parkinson's disease treatment in India. The devices offer a self-handling option for patients, providing continuous infusion for rapid absorption.

**MANKIND PHARMA - RAPID TESTING PREGNANCY DEVICE:****DATE: APRIL 13, 2022**

Summary: Mankind Pharma launched Prega News Advance, an advanced pregnancy detection test kit. It offers a mid-stream test device for direct urine stream testing, providing accurate results in three minutes, enhancing convenience for users.

**CADILA PHARMACEUTICALS - THRABIS RABIES VACCINE:****DATE: APRIL 8, 2022**

Summary: Cadila Pharmaceuticals introduced ThRabis, a novel three-dose recombinant nanoparticle-based rabies G protein vaccine. The vaccine aims to offer protection against rabies and contribute to reducing the global burden of rabies-related fatalities.

**ROCHE PHARMA - PHESGO FOR HER-2 POSITIVE BREAST CANCER:****DATE: MAY 12, 2022**

Summary: Roche Pharma launched PHESGO, a fixed-dose formulation combining Perjeta and Herceptin with hyaluronidase for subcutaneous administration. The therapy targets early and metastatic HER2-positive breast cancer, offering shorter administration times.

**ZYDUS LIFESCIENCES - BEMDAC FOR UNCONTROLLED LDL-CHOLESTEROL:****DATE: MAY 16, 2022**

Summary: Zydus Lifesciences launched Bemdac (Bempedoic acid), a new class of drug in India for patients with uncontrolled levels of LDL-Cholesterol despite lifestyle modifications and statin use.

**CADILA PHARMACEUTICALS - BELMORE CHOLESTEROL DRUG:****DATE: MAY 25, 2022**

Summary: Cadila Pharmaceuticals introduced Belmore, a unique drug for the treatment of high LDL cholesterol in India.

**AVESTHAGEN - GENETIC TESTS FOR CANCERS WITH WIPRO PARTNERSHIP:****DATE: JUNE 20, 2022**

Summary: Avesthagen partnered with Wipro to launch genetic testing for cancers, starting with the CALiBRxO 624 gene panel. The collaboration aims to offer genome-led medicine and expand across South Asia, Southeast Asia, and the MENA region.

**BASF AND PERMIONICS - HIGH-PERFORMANCE FACE MASKS:****DATE: JULY 4, 2022**

Summary: BASF collaborated with Permionics to introduce high-performance face masks using Ultrason E polymer. These breathable, washable, and reusable masks aim to serve the Indian healthcare market.

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Summary: Godrej Appliances launched InsuliCool, an innovative cooling solution for insulin storage. The product ensures precise temperature control, aiding diabetics in proper insulin storage.

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Summary: GOQii expanded its preventive healthcare portfolio with the launch of Smart Vital Ultra and GOQii Stream. These devices offer personalized coaching, health insights, and encourage a healthy and active lifestyle among young adults.



**ROCHE PHARMA INDIA - THE BLUE TREE 2.0 MOBILE APP:****DATE: NOVEMBER 29, 2022**

Summary: Roche Pharma India launched The Blue Tree 2.0 mobile app, part of the Blue Tree patient support program. The app enhances the patient experience, providing easy access to support services, drug assistance, and delivery tracking.

**APOLLO HOSPITALS - AUTOMATED RAPID-RESPONSE PATIENT MONITORING SYSTEM:****DATE: OCTOBER 12, 2022**

Summary: Apollo Hospitals introduced an automated patient monitoring system using advanced medical devices and wearables. The system continuously monitors patients, providing early alerts for timely intervention, improving patient outcomes. The technology is planned for expansion across the Apollo Hospitals network.

**DR. MOHAN'S DIABETES - AI-ENABLED DIGITAL INNOVATIONS:****DATE: OCTOBER 10, 2022**

Summary: Dr. Mohan's Diabetes Specialities Centre launched AI-enabled digital innovations under its digital transformation initiative, offering personalized 24/7 online care. The 3D Initiative includes 'DIA' (AI-powered chatbot), 'DIA-LA' (patient-friendly mobile app), and 'DIANA' (healthcare application for precision diabetes care).

**NIRAMAI - EASY LAUNCH KITS FOR BREAST CANCER SCREENING:****DATE: OCTOBER 3, 2022**

Summary: Bengaluru-based startup Niramai launched 'Easy Launch Kits' for breast cancer screening, providing affordable and accessible screening services. The initiative involves partnerships with organizations, hospitals, and diagnostic centers, aiming to triage populations and identify high-risk individuals.

**GENES2ME - NGS-BASED CLINICAL PANELS:****DATE: MAY 23, 2022**

Summary: Genes2Me launched next-generation sequencing (NGS)-based panels for oncology, personalized medicine, and hereditary diseases. The panels cover a wide range of genes, enabling comprehensive analysis and precise selection of drugs for personalized treatment.

**ROCHE DIABETES CARE INDIA - ACCU-FINE PEN NEEDLES:****DATE: MAY 9, 2022**

Summary: Roche Diabetes Care India launched ACCU-FINE pen needles to facilitate painless insulin delivery for people with diabetes. The needles are designed with features for gentle insertion, rapid insulin flow, and ease of use, contributing to improved diabetes management.

**MEDGENOME - VARMINER AI-ENABLED VARIANT INTERPRETATION SOFTWARE:****DATE: APRIL 11, 2022**

Summary: MedGenome Labs launched VarMiner, an AI-enabled variant interpretation software suite. VarMiner aids in detecting genetic variants for rare diseases and inherited cancers, providing clinicians and geneticists with deeper insights and actionable information.

**J MITRA - 4TH GEN ELISA-BASED HCV TEST:****DATE: SEPTEMBER 29, 2022**

Summary: J Mitra launched the 4th Generation Elisa-based HCV Test – the HCV Gen 4 Ag and Ab Microlisa. The test kit detects HCV core antigen and antibodies, offering high sensitivity and specificity for screening blood donations and clinical diagnostic testing of Hepatitis C.

**WIPRO GE HEALTHCARE - AI-ENABLED CATH LAB:****DATE: SEPTEMBER 5, 2022**

Summary: Wipro GE Healthcare launched the 'Optima IGS 320,' its first 'Made in India' AI-powered Cath lab for cardiovascular diseases. The Cath lab leverages GE's AutoRight technology, powered by Edison, offering real-time optimization of image and dose parameters through Artificial Intelligence.

**BIO-RAD - SEQUOIA EXPRESS STRANDED RNA LIBRARY PREP KIT:****DATE: JUNE 14, 2022**

Summary: Bio-Rad Laboratories introduced the SEQuoia Express Stranded RNA Library Prep Kit. This kit provides a cost-effective and automation-friendly solution for constructing robust RNA-Seq libraries in three hours, supporting efficient RNA-Seq workflows for comprehensive transcriptome profiling.

**BD - HIGH-THROUGHPUT MOLECULAR COMBINATION TEST FOR COVID-19 & INFLUENZA AB:****DATE: MAY 26, 2022**

Summary: BD launched a high-throughput molecular diagnostic combination test for SARS-CoV-2 and Influenza AB.

The BD SARS-CoV-2Flu assay, for the BD COR™ System, is an automated multiplexed real-time RT-PCR test designed to detect and differentiate respiratory viral infections from a single nasal sample.

**ABBOTT - HBSAG NEXT ASSAY FOR HEPATITIS B DETECTION:****DATE: MAY 9, 2022**

Summary: Abbott launched the HBsAg Next Qualitative solution in India to enhance the detection of Hepatitis B virus (HBV). The chemiluminescent microparticle immunoassay (CMIA) offers highly sensitive and early detection of HBV in human serum and plasma, supporting patient care and blood safety.

**YASHODA HOSPITALS - CONE BEAM CT GUIDED LUNG BIOPSY:****DATE: APRIL 1, 2022**

Summary: Yashoda Hospitals, Hyderabad, became the first in India to perform Cone Beam CT Guided Lung biopsy. This advanced technology aids in early-stage lung cancer diagnosis, enabling precision diagnosis and minimally-invasive treatment in the same room using the Philips-developed Lung Suite.

**NOVO NORDISK INDIA - ORAL SEMAGLUTIDE FOR DIABETES:**

Summary: Novo Nordisk India launched oral semaglutide, the world's first "peptide in a pill" for diabetes. Semaglutide, a GLP-1 receptor analogue, was previously available only in injection form. The oral formulation is a scientific breakthrough, protecting semaglutide from degradation and enhancing absorption.

These trends showcase advancements in medical technology, diagnostics, and pharmaceuticals, emphasizing innovations in cardiovascular care, RNA sequencing, diagnostic testing for respiratory infections, hepatitis B detection, lung cancer diagnosis, and oral formulations for diabetes management.



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# **POLICY FRAMEWORK**

# POLICY

BIOTECHNOLOGY | BIOMEDICAL INDUSTRY | BIOINDUSTRIAL | STATE-LEVEL

## BIOTECHNOLOGY

### REGULATORY DEVELOPMENTS AND ACHIEVEMENTS IN BIOTECHNOLOGY - 2022-23

The regulatory landscape in biotechnology during 2022-23 reflects proactive measures, technological advancements, and a commitment to environmental safety. The achievements and initiatives outlined in this report underscore the continued growth and development of the biotechnology sector in India.

The focus was on the Rules for the Manufacture, Use, Import, Export, and Storage of Hazardous micro-organisms Genetically engineered organisms or cells (Rules 1989), enacted under the Environment (Protection) Act, 1986.

**Regulatory Framework:** Enacted on December 5, 1989, under the Environment (Protection) Act, 1986, the Rules 1989 empower the Ministry of Environment, Forest and Climate Change (MoEF&CC) to safeguard the environment, nature, and health concerning gene technology and micro-organisms. To ensure nationwide implementation, six competent authorities and roles have been established under these rules.

**Review Committee on Genetic Manipulation (RCGM):** The Review Committee on Genetic Manipulation (RCGM), operating within the Department of Biotechnology, plays a crucial role in monitoring safety aspects of ongoing research projects involving genetically engineered organisms hazardous microorganisms. It

provides guidelines for regulatory processes, ensuring adherence to environmental safety standards. The committee meticulously reviews projects involving high-risk categories and controlled field experiments, imposing restrictions when necessary.

#### MAJOR ACHIEVEMENTS - 2022-23:

- **RCGM Meetings:** A total of 24 RCGM meetings were conducted.
- **Biopharma Applications:** The committee considered 586 Biopharma applications.
- **Agriculture Applications:** Evaluation of 99 Agriculture applications.
- **Awareness Sessions:** 20 awareness generation cum interactive sessions were conducted for researchers.
- **IBSC Registrations:** The year saw the registration of 91 new Institutional Biosafety Committees (IBSC).

**Guidelines for Genome Edited Plants:** The Department of Biotechnology (DBT) took significant steps by notifying the Guidelines for Safety Assessment of Genome Edited Plants, 2022. These guidelines serve as a roadmap for the development and sustainable use of Genome Editing Technologies for plants in India, addressing biosafety concerns and outlining regulatory pathways.

**Standard Operating Procedures (SOPs) for Regulatory Review:** To facilitate regulatory review for research and development of genome-edited plants falling under SDN-1 and SDN-2 categories, SOPs were notified by DBT. These procedures are applicable only for research and development conducted under contained conditions.

**Biological Research Regulatory Approval Portal (BioRRAP) Launch:** In line with the "One Nation, One Portal" initiative, the Biological Research Regulatory Approval Portal (BioRRAP) was launched on May 21, 2022. BioRRAP serves as a single national portal for biology researchers, streamlining regulatory approvals for biological research and development activities. This emphasizes both the "Ease of Science" and the "Ease of Business."

**Foreign Trade: In-House R&D Recognition, and Other Issues:** Recognizing the indispensable role of trade in the country's economy, the Department provided comments on applications for fixation of IO norms and export/import of restricted items. Additionally, 25 R&D units in the biotechnology sector were recommended for in-house R&D recognition.

**Restructuring of DBT Institutions:** DBT has amalgamated its 14 Autonomous Institutions into a single unified entity known as the Biotechnology Research and Innovation Council (BRIC). This is to enhance the scientific character and outcomes of the institutes, Foster research synergies and implement new education programs in line with the National Education Policy (NEP), and improve human resource structures. Aims to achieve "Minimum Government, Maximum Governance."

## KEY STRATEGIC INPUTS AND REGULATORY FACILITATION IN BIOTECHNOLOGY

Key Strategy Inputs through Stakeholder Consultation were sought by policy mak-

ers. Here are some of the initiatives that are being considered.

- **Make in India 2.0 Plan:** Policy, fiscal, and regulatory recommendations for biotech subsectors have been collated and submitted to the DPIIT-CII National Consultation Action Plan Committee.
- **India as a \$100 Bn Bio-Manufacturing Hub:** Recommendations have been proposed to position India as a significant bio-manufacturing hub.
- **Covid-19 Fallout Recommendations:** INR 100 Cr has been sanctioned from the Finance Ministry to address the fallout of Covid-19 on startup sustenance.
- **Establishing Technology Clusters:** Work is in progress to establish technology clusters.
- **Research Linked Incentives Proposal:** A draft proposal, based on stakeholder inputs, has been prepared to promote biotech innovations in moonshot areas.
- **Digital Healthtech Innovations:** The Amrit Grand Innovation challenge, JanCARE, has been launched to identify and support 75 innovations in digital health tech, telemedicine, mHealth using AI, ML, and blockchain.

## REGULATORY FACILITATION INITIATIVES

- **FIRST HUB:** Regulatory facilitation is provided to startups through FIRST HUB, where experts from various regulatory bodies resolve queries. Over 750 queries have been resolved.
- **Regulatory Facilitation Information Cell (RFIC):** Established at BIRAC's Regional Centre in Pune, RFIC assists biotech startups throughout the year, facilitating 250+ startups, 11 ISO certi-



fications, and 10 product approvals.

- **Fund of Funds - AcE:** Managed through the Make in India Cell, this initiative has attracted SEBI registered Alternate Investment Funds. There are now 10

Daughter Funds with a BIRAC investment commitment of INR 114.5 Cr, supporting 65 biotech companies and startups with funding of INR 733 Cr. A new call for applications to identify new partners has been launched.

## BIOMEDICAL INDUSTRY

### NATIONAL MEDICAL DEVICES POLICY

The medical devices sector encompasses electronic equipment, implants, consumables and disposables, surgical instruments, and in-vitro diagnostic reagents, further classified into 24+1 sub-categories as per the Central Drugs Standard Control Organization (CDSCO). The medical devices sector in India is a rapidly growing, sunrise industry, contributing 1.5% to the global medical device market. Factors driving this growth include a rising and aging population, increased per capita and disposable income, demand for healthcare infrastructure, expanded diagnostic services, and healthcare service dissemination. Additionally, the veterinary sector is emerging as a vital and growing sector, necessitating the development of affordable veterinary medical devices for both domestic and export markets.

**Role During COVID-19:** The policy recognizes the significant contribution of the Indian medical devices sector during the COVID-19 pandemic. Through large-scale production, it supported the domestic and global battle against the virus by manufacturing critical items such as ventilators, rapid antigen test kits, RT-PCR kits, infrared thermometers, PPE kits, and N-95 masks.

The direction is to harness the potential of the medical devices sector effectively. Despite various government schemes and initiatives, a holistic policy is essential to provide a guiding framework for

sustained growth and development. The objective is to facilitate orderly growth, ensuring access, affordability, quality, and innovation in the medical device sector. Aligning with the 'Atmanirbhar Bharat' and 'Make in India' programs, the policy aims to encourage domestic investments and production of medical devices.

### KEY HIGHLIGHTS OF MEDICAL DEVICE SECTOR PROMOTION STRATEGIES:

#### ■ **Regulatory Streamlining:**

- Introduction of a 'Single Window Clearance System' for Medical Device Licensing.
- Expansion of Indian Standards by bodies like BIS for enhanced standardization.
- Framework development for coherent pricing regulation aligned with DPCO.
- Creation of a Guidance Framework for researchers, innovators, and entrepreneurs.
- Institutional arrangement for aligning NMC Regulations and industry ethics.

#### ■ **Enabling Infrastructure:**

- Establishment and strengthening of medical device parks and clusters.
- Creation of testing and certification facilities for medical devices.
- Support for phased manufacturing of critical components for uninterrupted supply.

#### ■ **Facilitating R&D and Innovation:**

- Encouragement of industry-academia collaboration for innovation.
- Coordination for establishing Centers of Excellence in premier institutions.
- Exploration of innovation hubs to create a health technology ecosystem.
- Convergence of resources under institutions like BIRAC to promote innovation.

#### ■ **Attracting Investments:**

- Encouragement of private investments through risk-based financing.
- Promotion of seed capital and funding from Venture Capitalists.
- Introduction of new financing models, including blended finance.
- Utilization of initiatives like Start-up mission to encourage startups.
- Leveraging policies like Public Procurement (Make in India) and Ayushman Bharat for domestic manufacturing promotion.

Since Medical Device sector is highly innovation and technology driven sector and Next generation technologies including 5G& 6G, IoTs and AI are envisaged to play an important role in medical devices in the diagnostic equipment, data

analytics, personal devices and patient care. The policy envisages to promote innovation and Research and Development (R&D), including for Joint R&D projects involving academic institutions and industry under the ambit of Department's proposed 'National Policy on R&D and Innovation in the Pharma- MedTech Sector in India', through the following.

- Efforts of Governments and Industry to establish Centers of Excellence (CoEs) in premier academic and research institutions towards building world-class institutions and attract global faculties will be coordinated.
- Innovation hubs, housing a network of academic institutions, start-ups, clinical settings, funding agencies, etc. to create a health technology ecosystem, by providing 'plug and play' infrastructure.
- The available resources under various institutions such as Biotechnology Industry Research Assistance Council (BIRAC), Start-up mission, AGNIi and other enabling mechanisms will be sought to be converged to promote innovation and commercialization in India to maximize the utilization of government funded inventions.

## BIOINDUSTRIAL POLICIES

### MEASURES TO ENCOURAGE ETHANOL-BLENDED FUEL

The Union Budget 2022-23 introduced measures to promote the use of ethanol-blended fuel in India, aligning with the nation's commitment to Sustainable Development Goals (SDGs) and clean energy. The budget proposes an additional differential excise duty of Rupees Two per liter on unblended fuel from October 1, 2022, to incentivize the blending of fuel and propel India towards energy security and a low carbon economy.

Ethanol Blending Program:

#### ■ **Fuel Ethanol Demand:**

- Projected increase in India's ethanol requirement for petrol blending from 173 crore litres (2019-20) to 1,016 crore litres (2025-26).
- Suggested supply from surplus to deficit states for uniform ethanol blend availability.

#### ■ **Ethanol Blending Roadmap:**

- Recommends notifying a plan for

E10 fuel (10% ethanol, 90% petrol) availability by April 2022.

- Proposes a phased rollout of E20 fuel from April 2023, targeting availability by 2025.
- Advocates beginning higher ethanol blends in states with surplus production.

#### ■ **Regulatory Clearances:**

- Urges expedited regulatory clearances for ethanol production.
- Recommends a single window system by the Department for Promotion of Industry and Internal Trade for swift project clearances.

#### ■ **Environmental Impact:**

- Emphasizes water conservation, suggesting incentives for ethanol sourcing from less water-intensive crops.

- Encourages production from maize and second-generation sources.

#### ■ **Ethanol-Compatible Vehicles:**

- Stresses holistic vehicle design for higher ethanol blends to prevent engine failure and low fuel economy.
- Recommends rolling out E20 material compliant and E10 tuned engine vehicles nationwide from April 2023.
- Proposes E20 tuned engine vehicles rollout from April 2025.

#### ■ **Unrestricted Movement of Ethanol:**

- Highlights denatured ethanol's use for blending, deemed unfit for human consumption.
- Recommends central government control for unrestricted movement across India, avoiding state-level restrictions.

## BIOTECH POLICIES IN STATES

### GUJARAT BIOTECH POLICY 2022-27

The Gujarat government unveiled its ambitious Biotechnology Policy for the period 2022-27, recognizing the pivotal role of the biotechnology industry in fostering economic growth and addressing challenges across various sectors. This strategic move aimed to leverage the state's well-established industrial ecosystem, particularly its leadership in manufacturing sectors like Pharmaceuticals, Chemicals, Petrochemicals, Cement, and Power.

- Gujarat aims to leverage national policies for economic development by forming alliances between capital-intensive research and modern knowledge.
- The state has established the Gujarat State Biotechnology Mission (GSBTM) to promote biotechnology development.

- Its targets for the Next Five Years include supporting 500 units businesses, attract over Rs 20,000 crore of investments (\$2.4 Billion), create over 1.2 lakh jobs, and establish Gujarat as a leading state in biotechnology.

#### INCENTIVE PACKAGES:

- Package 1 (GFCI < Rs 200 crores. i.e., \$25 million):
  - Capital assistance, operational assistance, employment generation incentive, EPF assistance, interest subsidy, and electricity duty reimbursement. Maximum assistance of Rs 40 crore (\$5 million) and strategic importance will be given for assistance of up to 25% of the total capital expenditure. This assistance will be provided in the form of 20 quarterly instalments over a period of 5 years.

- Package 2 (Mega & Special Projects):
  - Similar incentives as Package 1 but with higher ceilings, along with facilitation support.
  - Electricity Duty: 100% reimbursement for five years on the electricity duty paid.
  - Interest Subsidy on term loan: Quarterly return at the rate of 7% against interest paid on term loans of up to Rs 100 crore (\$12 million), with an annual ceiling of Rs. 7 crore (\$0.84 million). Besides, quarterly return at the rate of 3% against interest paid on term loans of above Rs.100 crore (\$12 million), with an annual ceiling of Rs.20 crore

#### POLICY IMPLEMENTATION:

- Mission Director, GSBTM, will implement the policy in consultation with the Department of Science and Technology.
- Technical Advisory Committee (TAC) will address ambiguity and provide inputs on emerging technologies.
- Units can choose incentives under this policy or the Industrial Policy but not both.

#### INVESTOR FACILITATION AND GUIDELINES:

- Government acts as a facilitator, establishing a single-window clearance mechanism and a helpdesk.
- Gujarat State Biotechnology Mission serves as a nodal agency, and detailed implementation guidelines will be issued.

#### POWER TO AMEND AND OPERATIVE PERIOD:

- The government reserves the right to review and amend the policy.
- The policy is effective until March 31,

2027, or until the introduction of a new or revised policy.

#### TAMIL NADU HAS LIFE SCIENCES PROMOTION AND RESEARCH AND DEVELOPMENT POLICY

Tamil Nadu recognizes the importance of the Life Sciences sector in achieving SDGs and is investing in drugs and medical devices manufacturing, skill development, and lab construction. It announced a new policy. This Policy is applicable for greenfield, or expansion projects engaged in the following areas of Life Sciences, namely

- Biotechnology and BioServices
- Pharmaceutical and Nutraceutical Industry
- Medical Devices
- Medical Textiles.

**Research Ecosystem:** Tamil Nadu has established TICEL Bio-Park to focus on the application of advanced technology in microbiology and molecular biology, supporting and amplifying the Life Sciences research ecosystem. It is home to prestigious institutions such as Dr. M.G.R. Medical University, Madras Medical College, IIT-Madras, Anna University, IIBAT, Tamil Nadu Agricultural University, and Tamil Nadu Veterinary and Animal Services University.

**Investment and Job Generation Goals:** The government aims to attract Rs 20,000 crore (\$2.5 Billion) of investment in the Life Sciences sector, with a parallel objective of generating 50,000 jobs.

**Sunrise Sectors:** Medical electronics, devices, equipment, biotechnology, pharmaceuticals, bulk drugs, nutraceuticals, and technical textiles, including medical textiles, are recognized as sunrise sectors under TNIP 2021. These sectors qualify for special incentives.

**R&D Policy Objectives:** The Research and Development (R&D) policy targets doubling the R&D expenditure in the state by 2030. It focuses on increasing inputs to R&D, including the number of researchers and scientists, boosting innovation outputs such as patents and publications, and developing a collaborative innovation ecosystem with research parks, centers, hubs, and excellence centers.

**Private Sector Promotion:** The policy emphasizes the promotion of R&D in the private sector.

**Duration of Policy:** The R&D policy will be effective from the date of the government order and is valid for ten years or until a new policy is introduced, whichever comes earlier.

#### SUMMARY OF NEW INITIATIVES:

##### BIOTECHNOLOGY AND PHARMACEUTICAL PARKS:

- TICEL Bio Parks: Developed by TIDCO and TIDEL Park Limited in Chennai and Coimbatore, it offers facilities for pilot-scale production, labs for testing, and infrastructure for Good Laboratory Practice (GLP) and Good Manufacturing Practice (GMP).
- Biotech Core Instrumentation Facility (BTCIF): Jointly established with the Department of Biotechnology, it supports research in various sciences, with incubation centers for Biopharma start-ups.
- Incubation Parks: Established at IIT-M Research Park and Golden Jubilee Biotech Park for Women Society to encourage innovation and support women entrepreneurs in biotechnology.

##### BIOLOGICS AND PHARMACEUTICAL PARKS:

- Focus on manufacturing biologics with common facilities like training centers, R&D centers, and effluent treatment plants in strategic locations. Custom-

ized facilities will be developed based on requirements through public-private partnerships.

##### MEDICAL DEVICE PARKS:

- The government plans to develop a dedicated park for medical devices to enhance indigenous manufacturing, improve cost efficiency, and achieve accelerated growth. SIPCOT is developing an exclusive greenfield industrial park at Oragadam, including common facilities and ensuring uninterrupted water and electricity supply.

##### MEDICAL TEXTILE PARKS:

- Aim to boost medical textiles manufacturing and research, with Integrated Technical Textile Parks established by SIDCO in Thandarai and Punjaikalakurichi. SIPCOT will develop a mega textile park at Virudhnagar, offering common infrastructure and utilities to support MSMEs in medical textiles manufacturing.

##### GENERAL SUPPORT AND VISION:

- The government aims to create a conducive environment for life-science manufacturing, including the establishment of greenfield Life Sciences clusters, identifying strategic locations for parks, and taking steps for financing, ease of doing business, education, and skill development.

A Research & Technology Fund with a corpus of Rs. 100 crore (\$12 million) has been set up by the Government of Tamil Nadu to support R&D and technology adoption in sunrise sectors. The fund shall be used to aid research and stand-alone industrial R&D projects operating in segments of Life Sciences.

#### VISION FOR TELANGANA LIFE SCIENCES

The state wished to become the Leading life-sciences hub in Asia through innovation-driven & tech-enabled growth, while

doubling the sectoral value to US\$ 100 Billion and adding 400,000 new jobs by 2030.

#### PROMOTING INNOVATION:

- Scaling up infrastructure to support start-ups in advancing to the commercialization stage.
- Increasing funding sources for both existing and emerging innovations.
- Establishing technology-sharing and transfer linkages between industry and academia.
- Initiating grant-backed missions to address critical diseases locally.
- Leading in clinical trials to enhance the state's global position.

#### BUILDING A WORLD-CLASS LIFE SCIENCES ECOSYSTEM:

- Developing a Pharma City designed for an integrated healthcare ecosystem, going beyond a traditional industrial estate.
- Fostering growth in the equipment manufacturing industry.
- Attracting multinational corporations (MNCs) as anchor tenants across various life sciences domains.
- Enabling Sustainable Growth:
  - Creating training programs to bridge the talent-employability gap.
  - Simplifying the regulatory framework governing the local life sciences sector.
  - Improving operational ease for existing industries.
  - Offering financial incentives to attract fresh investments.
  - Undertaking policy changes regularly

and strengthening the investment promotion body with a life sciences focus.

#### COLLABORATIVE APPROACH:

- Emphasizing collaboration with industry players, academia, the central government, and investors.
- Strategic interventions aiming to position Telangana as a leading life sciences cluster in Asia and globally by 2030.

#### UTTAR PRADESH PHARMACEUTICAL AND MEDICAL DEVICES INDUSTRY POLICY, 2023

Uttar Pradesh government has released the Pharmaceutical and Medical Devices Industry Policy, 2023, with provisions for single window clearance and support other than incentives for pharma parks, manufacturing units, and support to start ups and marketing activities.

#### KEY HIGHLIGHTS OF POLICY, 2023

##### SINGLE WINDOW CLEARANCE SYSTEM:

- Monitored directly by the Chief Minister's office.
- Time-bound clearances, approvals, and permits for pharmaceutical and medical device projects.

##### REGULATORY SUPPORT:

- Food Safety and Drug Administration (FSDA) to assist in pollution NOC and other necessary clearances.
- Uttar Pradesh Pharmaceutical Development Cell (UPPDC) to be established for technical guidance and support

##### POLICY IMPLEMENTATION:

- Policy Implementation Unit (PIU) under the Commissioner of Infrastructure and Industrial Development.
- Approvals for micro, small, medium enterprises (MSMEs) and large categories.



**EMPOWERED COMMITTEE:**

- Oversight by an Empowered Committee chaired by the Chief Secretary.
- Authority for approving mega projects--capital investment over Rs. 100 crore (\$12 million).

**INCENTIVES FOR PHARMA AND MEDICAL DEVICE PARKS:**

- Support for horizontal and vertical parks, both private.
- Special incentives and concessions for mega projects and SMEs.
- Capital subsidy, interest subsidy, stamp duty exemptions, and more.

**DEVELOPMENT FOCUS:**

- Identify land parcels for manufacturing allopathic, Ayush products, medical devices, and key starting materials.
- Aim to create manufacturing giants with global competitiveness.

**INCENTIVES FOR DEVELOPERS:**

- Interest subsidy reimbursement for land purchase and infrastructure building.

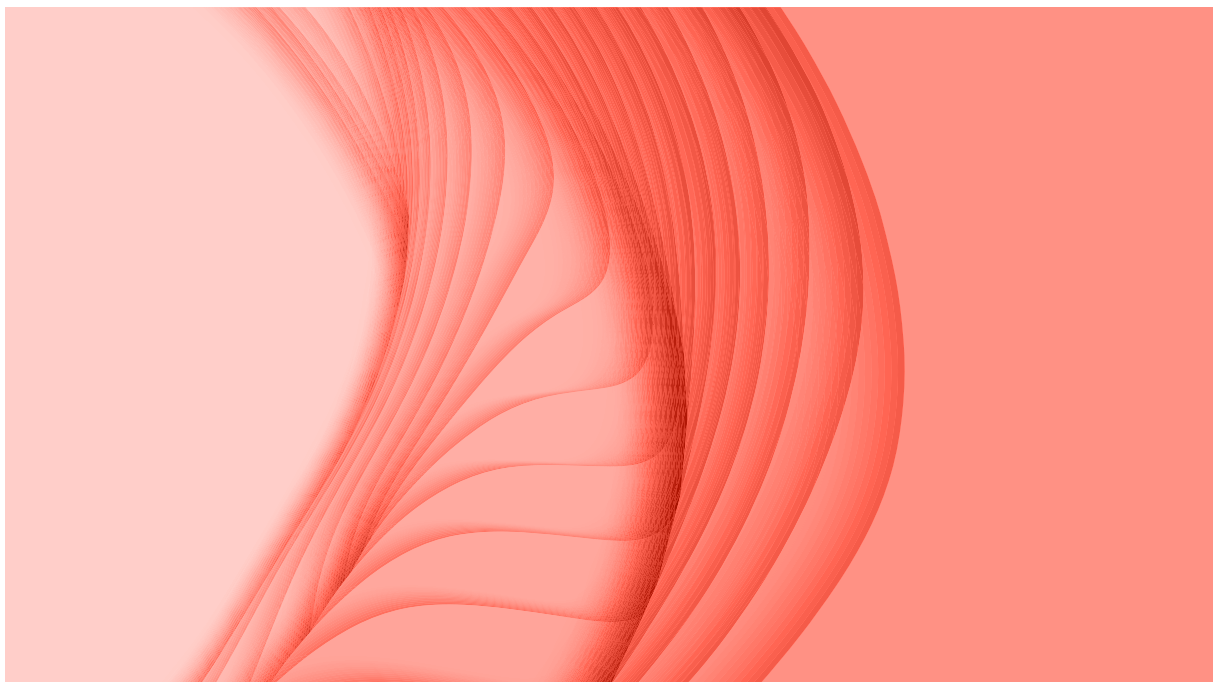
- Stamp duty exemptions for developers and individual buyers.
- Capital subsidy for common infrastructure and utilities in private pharmaceutical parks.

**STATE'S ECONOMIC SIGNIFICANCE:**

- Uttar Pradesh is the third largest economy in India.
- Largest consumer market with around 240 million population.
- Robust healthcare distribution network and existing manufacturing units.

**JOB CREATION AND INVESTMENTS:**

- Around 217 companies proposing nearly Rs. 28,500 crore (\$3.4 billion) investments.
- Expected to generate approximately 57,000 job opportunities.
- Focus on encouraging local production, research and development, and improving medicine availability.





## BIRAC IMPACT

**10+ YEARS OF  
BIRAC:  
Nurturing & Strengthening  
Biotech Innovation  
Enterprise**







# KEY BIOTECH DEVELOPMENTS IN 2022

## MAJOR DEVELOPMENTS

# BIOTECH STRIDES IN 2022

In 2022, India made remarkable strides in biotechnology, advancing healthcare, vaccine production, and initiatives like the Production Linked Incentive (PLI) scheme. This report delves into key capacity statistics, highlighting India's infrastructure capabilities. From the impactful PLI scheme to increased Foreign Direct Investment (FDI) and societal development through biotech, the narrative explores pivotal developments. The report also emphasizes the crucial role of the National Biopharma Mission (NBM) and the Department of Biotechnology (DBT), especially during the COVID-19 pandemic, showcasing India's commitment to biotechnological innovation and societal well-being.

## UNVEILING KEY CAPACITY STATISTICS FOR 2022

The essential metrics of 2022 provide a thorough understanding of the varied aspects within the biotech industry. Covering a range of projects, such as Molasses and Grain Based initiatives, in addition to significant capacities in ethanol production, these metrics shed light on the infrastructure's capabil-

ities. India's substantial role in both Covid and non-Covid vaccine production adds a crucial dimension to the narrative of growth. The accomplishments of the Production Linked Incentive (PLI) scheme and also cotton crop production are noteworthy.

| Particulars   | Metrics       |
|---|---------------|
| No. Molasses Based projects   | 263           |
| Installed Capacity of Molasses based Production (in Crore liters p.a.)                              | 619.4         |
| No. Grain Based projects  | 123           |
| Installed Capacity of Grain based Production (in Crore liters p.a.)                                 | 328.5         |
| Total Installed Capacity of ethanol production (in Crore liters p.a.)                               | 947.9         |
| India's Share of Covid Vaccines (billion doses 2021)  | 2.46          |
| India's Share of non-Covid Vaccines (billion doses 2021)  | 1.98          |
| Cotton crop production for the (October-September) season in million bales of 170 kg                | 34.1          |
| PLI: Number of selected applicants  | 76            |
| PLI: Total number of applications received under the PLI scheme                                     | 249           |
| PLI: Number of products spread across the four Target categories for domestic manufacturing scheme. | 55            |
| PLI: Total committed investment of Rs 4,138.41 crore  | \$500 million |
| PLI: Expected employment generation of persons.   | 10,598        |

Note: The information on PLI encompasses details about the Production Linked Incentive (PLI) Scheme for Pharmaceuticals.

Source: ABLE Analysis

## PLI SCHEME

Launched in 2021 under the Atmanirbharta initiative, the Product Linked Incentive (PLI) scheme boasts a financial outlay of \$1.8 billion (Rs. 15,000 crores) spread across six years. In its inaugural production year (2022-2023), the scheme selected 55 applicants, including 20 MSMEs, with a budgetary allocation of \$83 million (Rs. 690 crores).

### **Incentives and Employment Impact:**

The Department of Pharmaceuticals (DoP) disbursed the first tranche of incentives, totaling \$20 million (Rs. 166 crores), benefiting four selected applicants under the PLI scheme for pharmaceuticals. This initiative generated employment for 23,000 individuals. The scheme also offers incentives ranging from 10% to 3% based on incremental sales. The selected 55 applicants collectively reported sales of approximately \$4.3 billion, with a total installed capacity exceeding 33,000 tonnes.

**Impact on Bulk Drugs Production:** The PLI scheme for Bulk Drugs has seen an investment of \$242 million (Rs. 2019 crores) and provided employment for about 1900 individuals. While the full

impact on production capacity is anticipated in the coming years, there's already a notable 4.54% reduction in India's imports of bulk drugs and intermediates globally.

### **Achievements in Medical Devices Sector:**

Under the PLI scheme for Medical Devices, with a \$410 million (Rs. 3,420 crores) outlay, an investment of \$86 million (Rs. 714 crores) has been reported. This marks a significant milestone, as it has enabled the domestic production of high-end medical devices in India for the first time, creating employment for about 2900 individuals. The scheme has approved 21 applicants with a committed investment of \$127 million and an expected employment generation of around 6,411 persons.

## FOREIGN DIRECT INVESTMENT (FDI) IN PHARMA SECTOR

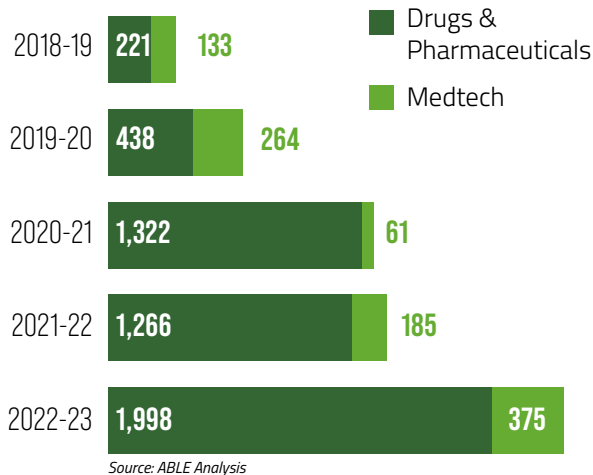
Launched in 2021 under the Atmanirbharta initiative, the Product Linked Incentive (PLI) scheme boasts a financial outlay of \$1.8 billion (Rs. 15,000 crores) spread across six years. In its inaugural production year (2022-2023), the scheme selected 55 applicants, including 20 MSMEs, with a budgetary allocation of \$83 million (Rs. 690 crores).

The Government has established an investor-friendly FDI policy to encourage investment in the pharmaceutical sector. In Medical Devices, 100% foreign investment is permitted under the automatic route. In pharmaceuticals, up to 100% FDI is allowed in greenfield projects, and up to 74% FDI in brownfield projects is permitted under the automatic route. Government approval is required for foreign investment beyond 74% in brownfield projects.

The pharmaceutical sector contributes approximately 3.71% to the total FDI

inflows in the country. From April 2000 to March 2023, FDI inflows in Drugs & Pharmaceuticals (Pharma) and Medtech Sectors reached \$6.26 billion.

The FDI inflows in the pharmaceutical sector, including both drugs & pharmaceuticals and medtech activities, grew by 6.7 times from \$354 million in 2018. In the financial year 2022-23, FDI inflows in the pharmaceutical sector amounted to \$2 billion from drugs & pharmaceuticals activities and \$375 million from medtech activities, totaling \$2.37 billion. Additionally, between January 1, 2022,



Source: ABLE Analysis

## SOCIETAL IMPACT

Biotechnology-driven societal development is on uplifting vulnerable segments, particularly in Aspirational Districts. DBT has concentrated on such areas. Notable achievements in 2022-23 include supporting 32 projects that benefited over 5,000 individuals, with a strong emphasis on empowering women (65% beneficiaries) and marginalized communities (56% from SC/ST groups). These initiatives, ranging from organic cultivation to animal health camps, led to a commendable 30% average income increase.

## MAJOR DEVELOPMENTS IN HEALTHCARE SUPPORTED BY GOVT

Several notable advancements in healthcare have emanated from the Department of Biotechnology (DBT) and its affiliated institutions. In Bangalore, the formation of Sepio Health Pvt Ltd, a spin-off company, reflects the successful translation of technologies developed at DBT-inStem. One groundbreaking achievement is the creation of Albumin-Sorafenib (ABSORF), a nano-medicine product designed for treating liver cancer, renal cancer, and leukemia. Another innovation includes the development of magnetically-driven nano-motors used to explore the micro-environment of cancer within a 3D tumor model. Additionally, a product has been devised to minimize pesticide exposure during spraying, reducing risks associat-

and November 30, 2022, the Department of Pharmaceuticals approved 21 FDI proposals for brownfield projects, amounting to \$560 million.

Biotech FDI constitutes an estimated 40% of the total FDI in Drugs & Pharmaceuticals Activities. The combined FDI in medical devices and drugs & pharmaceutical activities amounted to \$1.17 billion, representing a significant increase of nearly 1.7 times over the previous financial year.

On another front, the Biotech-Krishi Innovation Science Application Network (Biotech-KISAN) endeavors to enhance agricultural productivity for small farmers, with success stories spanning grass pea cultivation in Bihar to empowering women farmers in the Sundarbans. Various hub activities and successes, such as the establishment of an organic farming hub in the Northeast, underscore the multifaceted impact of these biotechnological interventions in fostering sustainable agricultural practices and economic development.

ed with skin contact and inhalation.

Furthermore, significant strides have been made in nanobiotechnology, exemplified by the creation of self-fluorescent, cell-permeable glucose-derived carbon nanospheres. These nanospheres serve as a brain-targeting vehicle with implications for drug delivery and imaging, particularly in Alzheimer's disease. Another groundbreaking demonstration involves Magnetic Nanoparticle (MNP)-mediated hyperthermia-induced antimicrobial therapy, showcasing the intersection of nanotechnology and healthcare solutions. In support of these initiatives, a dedicated program, 'Catalyzing research in nanobiotechnology,' is being pursued

at the Indian Institute of Science, Bangalore.

### **NATIONAL BIOPHARMA MISSION (NBM)**

The National Biopharma Mission (NBM) is a collaborative initiative between the government, industry, and academia, with a dedicated focus on accelerating the transition from discovery research to early development in the field of biopharmaceuticals. Funded at a total cost of \$180 million (Rs 1,500 crore), with 50% co-funding from the World Bank, NBM has achieved significant milestones in various areas.

One crucial aspect is the establishment of shared facilities, with 14 out of the 23 supported facilities actively providing end-to-end services to meet the demands of the growing biotherapeutics, devices, and vaccine market. NBM has supported 70 projects across three verticals, with 10 in the clinical trial phase. These projects cover a spectrum of activities, including scientific research for efficient processing, tools for product development, and the establishment of Clinical Trial Networks (CTN) through the i3 program.

Moreover, NBM has fostered the creation of 11 Good Clinical Practice (GCP) compliant Field Sites, enhancing the capacity for vaccine clinical trials through seroepidemiological studies for diseases like COVID, dengue, and chikungunya. The mission has also supported the establishment of Technology Transfer Offices (TTOs) to facilitate an efficient technology transfer network in the country, with a recent workshop in Hyderabad ensuring coordination and policy alignment among the seven TTOs.

Under this Mission, 15 vaccine candidates for Cholera, Influenza, Dengue, Chikungunya, Pneumococcal disease, COVID-19 (early development) and four related technologies (were supported; 21 Biosimilar products and related technologies for

Diabetes, Rheumatological and ophthalmic diseases, Cancer; 29 Medical Devices & Diagnostics have been supported so far.

### **INDIA'S COVID-19 RESPONSE**

During the COVID-19 pandemic, DBT collaborated with the Biotechnology Industry Research Assistance Council (BIRAC) to swiftly respond to the crisis, aligning their research plan with the WHO's R&D blueprint. This led to the establishment of the DBT-BIRAC COVID-19 Research Consortium and the implementation of Mission COVID Suraksha under Atmanirbhar Bharat, focusing on testing, prevention, and treatment.

Under Mission COVID Suraksha, India successfully developed and received Emergency Use Authorization for five COVID-19 vaccines, including ZyCoV-D (world's first DNA vaccine), CORBEVAX, GEMCOVAC-19, the world's first intranasal vaccine (iNCOVACC), and the Omicron booster vaccine (GEMCOVAC-OM). DBT-BIRAC played a pivotal role in creating a supportive ecosystem for vaccine development, from establishing GCLP compliant clinical trial sites to augmenting manufacturing facilities for enhanced COVAXIN production.

Additionally, DBT's efforts extended to COVID-19 testing in a hub-and-spoke model, deployment of mobile diagnostic labs in remote areas, development of diagnostic kits, and regulatory facilitation. The department proactively issued Biosafety Regulations for COVID-19 and engaged in international partnerships to strengthen vaccine manufacturing and clinical trial capacities. The establishment of the Indian SARS-CoV-2 Genomic Consortium (INSACOG) further showcased India's commitment to monitoring viral variants during the pandemic. Through these initiatives, DBT played a crucial role in India's self-sufficiency in COVID-19 diagnosis and vaccine development.







# FORECAST & RECOMMENDATION

# CONCLUSIONS



## INDIA'S BIOECONOMY HITS \$137.2 BILLION IN 2022, EYES \$300B BY 2030!

India's BioEconomy achieved a remarkable 29% growth in 2022, soaring to a valuation of \$137.2 billion and setting its sights on a lofty \$300 billion by 2030 as part of a Circular Economy revolution.

### KEY FINDINGS

Here are some of the exciting developments that shaped 2022 and pave the way for the BioEconomy's ambitious journey ahead.

#### BIOECONOMY VALUATION AND CONTRIBUTION

In 2022, India's BioEconomy, valued at \$137.24 billion, became a robust contributor, constituting 4% of the nation's impressive gross domestic product (GDP) of \$3.47 trillion. Looking ahead, India aims to surpass the \$150 billion mark by 2024, with a visionary target of \$300 bil-

lion by 2030. The enthusiasm of visionaries, policymakers, and industry leaders is profound as they chart the BioEconomy's growth trajectory.

This performance can be attributed to several reasons, including the rising demand for bio-based products and services, government support for the BioEconomy, and decreasing costs in biotechnology and biomanufacturing.

#### STARTUP ECOSYSTEM

The year 2022 witnessed the addition of

1,391 biotech startups, expanding the 10-year base to 6,755. At this pace, projections indicate a thriving ecosystem with 35,460 startups by 2030. Achieving this goal necessitates the incorporation of an average of 3,590 new companies annually between 2023 and 2030, marking a substantial increase from five startups a day in 2025 to 15 in 2030.

### CAPACITIES

Amid rising investments and funding, the BioEconomy is witnessing aggressive capacity building. India's current ethanol production capacity of 684 crore liters for petrol blending is a significant stride toward the targeted 20% blending by 2030, requiring a 1,000-crore liter capacity. Companies in various sectors, including medical devices, biopharmaceuticals, vaccines, contract research, and manufacturing, are fortifying their strategies for the journey ahead.

### CONTRIBUTION OF KEY SEGMENTS

Breaking down the \$137 billion in 2022, the broad BioIndustrial and BioMedical segments contributed \$59 billion and \$57 billion, respectively. BioServices and BioAgri played pivotal roles, accounted for \$9 billion and \$11.5 billion. The segmentation underscores the diverse nature of India's BioEconomy. Notably, BioIndustrial includes the Aqua-Shrimp industry, Food and Beverage industry, Industrial sector, Laundry and Cleaning industry,

Paper and Pulp, Poultry Industry, Textile Industry, and Vegetable Oils industry. BioMedical comprises Biopharmaceuticals, diagnostics, and medical devices. BioAgriculture focuses on Bt Crops, Animal biotech, Biomass, Pesticides, and Fertilizers areas. BioServices encompass BioIT, Platforms, Contract Research, Drug Discovery, Patent Services, etc.

### FUTURE TRAJECTORY

The BioEconomy has the potential to grow over 2.5 times from the current \$137 billion in 2022. The breakdown of the 2030 target highlights the significant roles of Biomedical, BioIndustrial, BioAgri, and BioServices, setting the stage for a transformative decade ahead. At least two of these broad segments need to cross the \$100 billion threshold in 2030. The Biomedical sector is estimated to contribute \$128 billion, while the BioIndustrial segment is expected to reach \$121 billion. Both BioAgri and BioServices are anticipated to generate nearly \$40 billion each in the BioEconomy. Further subsegmentation reveals that Biofuels, Therapeutics, and BioServices are projected to contribute \$40-45 billion each by 2030, while BioAgri (including Bt Cotton) and Medical Devices is expected to generate \$20-30 billion. Additionally, four subsegments (Potable and Industrial Alcohol, Poultry Feed, Textile, and Aqua-Shrimp) are projected to fall within the \$10-20 billion range.

## ADVANCING CIRCULAR BIOECONOMY

In alignment with India's vision of a circular economy, the Department of Biotechnology (DBT) has initiated "Fostering High-Performance Biomanufacturing." This effort directly tackles global challenges such as climate change and unsustainable resource consumption, aligning with the Prime Minister's 'Net Zero' carbon economy vision and the 'Lifestyle for the Environment (LIFE)' initiative.

DBT, in collaboration with BIRAC, is committed to establishing a robust biotech innovation ecosystem. The National Biomanufacturing initiative places emphasis

on green chemistry, biocatalysis, precision therapeutics, and climate-resilient agriculture. The objective is to foster green, clean, prosperous, and self-reliant

solutions, leveraging public-private partnerships and international cooperation.

#### KEY DIRECTIONS:

Circular-BioEconomy Vision

DBT leverages advancements for a Circular-BioEconomy, pivotal for India's green growth.

#### TECHNOLOGY REVOLUTION

High-Performance Biomanufacturing involves precision engineering, necessitating innovative biology-engineering collaborations.

#### COMPREHENSIVE FOCUS

Targeting sectors like green chemistry, biocatalysis, climate-resilient agriculture, and precision therapeutics.

#### BIO-ENABLERS

Bio-Artificial Intelligence Hubs and Bio-manufacturing Hubs act as catalysts, fostering innovation with access to infrastructure and technology platforms.

#### STRATEGIC OUTCOMES:

Boost Domestic Biomanufacturing: Enhance Industry 4.0 capability.

Fuel Job Creation: Foster entrepreneurship in tier-2 and tier-3 cities.

Synergize STEM Fields: Enable collaboration between science, technology, engineering, and manufacturing.

Address Climate Challenges: Intensify research for climate change mitigation and decarbonization.

Promote Innovation Transition: Accelerate the shift to Biomanufacturing using AI, Digitalization, and biotechnology innovations.

Support 'Make-in-India': Encourage transformative yet affordable innovations for global market access.

India's High-Performance Biomanufacturing Initiative signifies a bold step toward sustainable growth, emphasizing innovation, collaboration, and a circular economy vision. It sets the stage for a bio-revolution, aligning economic prosperity with environmental stewardship, showcasing India's commitment to a cleaner and greener future.

## NURTURING INDIA'S BIOECONOMY: A JOURNEY TOWARDS \$1 TRILLION BY 2047

Over the next 25 years (India@2047), the Amrit Kaal Vision targets a nominal GDP of \$32.8 trillion, driven by rapid growth in manufacturing and services. The BioEconomy, currently at \$137.24 billion with a strong 14-15% CAGR, holds the potential to contribute 3-4% to India's GDP. The objective is a \$300 billion BioEconomy by 2030, paving the way for a leap to \$1 trillion in the subsequent two decades.

#### KEY STEPS:

Supply Chain Imperative: Create a circular system from research to market-ready products.

Enzyme technologies and synthetic biology play crucial roles, with fermentation-based biopharmaceuticals emerging as a significant component.

#### SECTORAL TRIUMPHS

Key sectors like agriculture, biofuels, and healthcare are major contributors.

#### INVESTMENT IMPERATIVES

Strategic investments in R&D and a Research Linked Incentive (RLI) scheme

are essential.

#### **POLICY ENABLERS**

Address biodiversity concerns, optimize schemes like RLI and PLI, and focus on crucial thrust areas.

#### **STEM TALENT**

Retain 25% of global STEM talent within India for sustained growth.

#### **CONVERGING TECHNOLOGIES**

Invest in AI, computational biology, bioinformatics, and Industry 4.0 for success.

#### **BIOMANUFACTURING ACCELERATION:**

##### **CURRENT STATUS**

BioManufacturing is at 40%, with room for expansion (Global Index: 6.2%).

##### **LEARNING FROM THE U.S.**

A \$2 billion investment is crucial for startups transitioning into large-scale manufacturing.

#### **RECOMMENDATIONS:**

##### **STRENGTHENING THE SUPPLY CHAIN**

Emphasize the importance of a resilient supply chain post-pandemic.

##### **MANUFACTURING SCHEMES**

Introduce schemes like Production-Linked Incentives (PLI) to boost production.

##### **INNOVATION AND FUNDING**

Encourage innovation with funding, especially for startups.

##### **DOMESTIC CONSUMPTION**

Stimulate domestic consumption of bio products for a self-sustaining market.

##### **BIOTECHNOLOGIST TRAINING**

Invest in training the next generation of biotechnologists.

##### **REGULATORY INNOVATION**

Implement regulatory innovations for streamlined processes.

#### **NATIONAL STANDARDS**

Establish national standards for bio products to ensure quality and compliance.

#### **BIOSECURITY INVESTMENTS**

Invest in biosecurity to protect the industry from potential risks.

#### **DATA MANAGEMENT**

Efficient data management is key for informed decision-making.

#### **BIOMANUFACTURING HUB RECOMMENDATIONS:**

##### **LAND AVAILABILITY**

Ensure a minimum of 200-acre contiguous land availability.

##### **SINGLE WINDOW CLEARANCE**

Implement a single window clearance system for all selected BioManufacturers.

##### **BIOTECH CLUSTERS**

Allocate acre modules to each manufacturer at select Biotech clusters (NE, J & K).

##### **SCALE-UP SUPPORT**

Encourage and support the scale-up of BioManufacturing Hubs.

##### **INFRASTRUCTURE BOOST**

Strengthen infrastructure for efficient operations.

##### **FISCAL INCENTIVES**

Introduce fiscal incentives for investments in production facilities.

#### **A COLLECTIVE ENDEAVOR FOR A FLOURISHING BIOECONOMY:**

India needs a coordinated national strategy, with public-private partnerships as the bedrock for a thriving bioeconomic landscape. Seizing the demographic dividend and harnessing STEM talent are crucial for economic growth and global leadership. The journey towards a sustainable BioEconomy is a collective endeavor for a brighter, greener, and more prosperous future.

# LEADERS SHARE INSIGHTS, DRIVING INNOVATION AND PROGRESS

"Biotech sector is one of the most Demand Driven Sectors. The campaigns for Ease of Living in India over the years have opened up new possibilities for the biotech sector,"

**MR NARENDRA MODI**  
PRIME MINISTER OF INDIA

"India will make significant investment in R&D to develop a roadmap for design and delivery of vaccine development for future pandemic,"

**DR JITENDRA SINGH**  
UNION MINISTER OF STATE (INDEPENDENT CHARGE) SCIENCE & TECHNOLOGY

"Just like UPI revolutionized payment transactions in India, Unified Health Interface (UHI) will revolutionize digital health service delivery,"

**DR R S SHARMA**  
CEO, NATIONAL HEALTH AUTHORITY.

"A vision document is being prepared for India to become a developed economy of about USD 30 trillion by 2047, and it will be released by Prime Minister Narendra Modi in January next year. The draft 'Vision India @2047' document will outline the institutional and structural changes/ reforms that will be needed for the country to become a developed nation by 2047,"

**MR BVR SUBRAHMANYAM**  
CEO, NITI AAYOG.

"There was a lot of investment in health systems made during the pandemic across countries, and it will definitely keep us well prepared in case there are other outbreaks,"

**MR ADAR POONAWALLA**  
CEO, SERUM INSTITUTE OF INDIA (SII).

"Developing innovative drugs is important because innovative medicines not only meet healthcare needs but also account for two-thirds of the global pharma market,"

**DR SHARVIL P PATEL**  
MANAGING DIRECTOR, ZYDUS LIFESCIENCES.

"With the rollout of iNCOVACC, we have achieved our goal of establishing a novel vaccine delivery platform for intranasal delivery. It proves that India can innovate for itself and for the world,"

**DR KRISHNA ELLA**  
EXECUTIVE CHAIRMAN, BHARAT BIOTECH.

"If India has to be at the cutting edge of innovation, our regulatory system also needs to undergo reforms. It needs to be reflecting the new kinds of work that goes on in this industry,"

**MR SATISH REDDY**  
CHAIRMAN, DR REDDY'S LABORATORIES.

"India's pharmaceutical industry could surpass USD 130 billion by 2030. The pharmaceutical sector in India is expanding at a remarkable rate, as demonstrated by the 8 per cent year-to-date increase in exports and the noteworthy 29 per cent surge in October 2023 alone. This growth is propelled by expanding market opportunities, heightened demand in the USA, and critical shortages of medicines in the US and Europe. Despite challenges in CIS countries, the global reception of Indian pharmaceuticals remains positive,"

**MR VEERAMANI S. V.**  
CHAIRMAN, PHARMEXCIL (PHARMACEUTICALS EXPORT PROMOTION COUNCIL OF INDIA).



“There are more funding opportunities for early-stage companies than 10 years ago. Government organizations like Biotechnology Industry Research Assistance Council have pushed innovation across the board — diagnostics, devices, new drugs, etc. They have provided seed funding to individuals and small companies that want to look at out-of-box ideas. The R&D ecosystem is developing due to push from innovators and pull from the government,”

**MR SHRIDHAR NARAYANAN**

**CHAIRMAN AND CEO OF FOUNDATION FOR NEGLECTED DISEASE RESEARCH, BENGALURU.**

“On occasion of World Biofuels Day (10th Aug), Prime Minister Narendra Modi unveiled the first of its kind & Asia’s First 2G Ethanol Bio-Refinery of Indian Oil Corporation Limited (IOCL) at Panipat Haryana. Praj is a technology licensor and EPCM partner for this project, which is based on our proprietary technology processing rice straw as feedstock for production of Ethanol. We are very proud of our association with IOCL to set up this coveted project. This plant is a huge milestone in realizing our Prime Minister’s vision of energy independent India. We believe success of this project reinforces India’s technology leadership in global BioEconomy,”

**DR. PRAMOD CHAUDHARI**

**FOUNDER-CHAIRMAN, PRAJ INDUSTRIES.**

“Over the time that we’ve been here, in the last seven-eight years, India has opened up to a lot more innovation-based solutions,”

**MS EZHIL SUBBIAN**

**CO-FOUNDER AND CEO, STRING BIO.**

“India is critical for Novozymes success. We’re going to continue to invest here. We produce in India for India, and we produce in India for the globe. So, we look at our Indian operations as a global asset,”

**MS ESTER BAIGET**

**PRESIDENT AND CEO, NOVOZYMES.**

“I think the timing is perfect right now for India to utilize artificial intelligence and machine learning, these fascinating new tools, to solve impactful and meaningful problems. I work in biotechnology, so we’re trying to address issues in agriculture, the environment, and healthcare—large impact areas that affect billions of people not just in India but all over the world. To be able to use technology to make such meaningful contributions to India and the universe is a great opportunity for us. I request all young entrepreneurs who are looking at AI and machine learning to work on impactful products. So, it is not Information Technology anymore; it’s impact technology,”

**DR ANAND ANANDKUMAR**

**CEO AND MD, BUGWORKS RESEARCH**

“Technologies like artificial intelligence and analytics can significantly improve efficiency in Indian agriculture. Indian farmers are increasingly becoming open to new technologies and practices for enhancing productivity and they can be our champions of sustainability at the grassroot level. Also, the role of biotechnology in agriculture is pivotal, particularly in precision breeding for climate-resilient crops and genetic modification for pest and disease resistance,”

**MR DEEPAK SOOD**

**Secretary General, ASSOCHAM.**

“AI can play an important role in prevention and early detection of cancer. At the same time, technological advancement will take healthcare to people’s doorstep. There won’t be a need for primary health centers or big labs with hand-held devices and miniaturization,”

**DR VIJAY CHANDRU**

**CO-FOUNDER & DIRECTOR STRAND LIFE SCIENCES**

“As the world grapples with the problems induced by climate change, helped by innovative government policies, ABLE members will play even greater role as the nation sets up more bio refineries to produce enough biofuels to achieve the 20% blending target by 2025,”

**MR GS KRISHNAN**

**PRESIDENT, ABLE**

# ACKNOWLEDGEMENTS AND SOURCES

This report has been compiled by sourcing information from a variety of reputable web sources and publicly available data. The comprehensive nature of the research involved accessing diverse online platforms and mining publicly accessible information to ensure the accuracy and breadth of the content presented. The acknowledgment extends to the wealth of data contributed by these sources, enabling a thorough and well-informed report.

- Biotechnology Industry Research Assistance Council (BIRAC), a public sector enterprise of DBT, Government of India.
- Department for Biotechnology (DBT), Ministry of Science and Technology, Government of India.
- Department of Commerce, Ministry of Commerce & Industry, Government of India.
- Directorate of Economics and Statistics (DES), Department of Agriculture, Cooperation and Farmers Welfare (DAC&FW), Government of India.
- Ministry of Petroleum & Natural Gas, Government of India.
- Ministry of Statistics & Programme Implementation National Statistical Office.
- Ministry of Textiles, Government of India.
- The Department of Pharmaceuticals, Ministry of Chemicals & Fertilizers, Government of India.
- World Health Organization.

Information has been gathered from diverse sources, including reports from Industry Associations, Market Research organizations, Investment Trackers, Press Releases, Newspapers, Magazines, presentations at Leading Events and conferences. The Food and Agriculture Organization (FAO) of the United Nations, European Commission's BioEconomy - Research & Innovation, press releases from various organizations, and reports from Market Research agencies and Media Publications have contributed to the compilation of data.

## CONTRIBUTORS

This report has been prepared for the “Make In India Facilitation Cell for Biotechnology” of Biotechnology Industry Research Assistance Council (BIRAC) by the Association of Biotechnology Led Enterprises (ABLE).

ABLE is a non-profit, nationwide forum dedicated to representing the Indian Biotechnology Sector. With a membership exceeding 400, ABLE ([www.ableindia.in](http://www.ableindia.in), Twitter @able\_indiabiotech) encompasses diverse stakeholders from across India, including Agribiotech, Bio-pharma, Industrial biotech, Bioinformatics, Investment banks, Venture Capital firms, leading Research and Academic Institutes, Law Firms, and Equipment Suppliers, collectively representing all verticals within the sector.

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## ABLE CONTRIBUTORS TO THE REPORT

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