



# INDIA BIOECONOMY REPORT 2021



# INDIA BIOECONOMY REPORT

MARCH 2021

---

© BIRAC

*This report has been prepared for the "Make in India" cell 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*

# Contents

<b>FOREWORD</b> .....	<b>4</b>
<i>Potential Unleashed</i> .....	4
<b>Dr. Renu Swarup</b> .....	5
<i>(Secretary, Department of Biotechnology Ministry of Science &amp; Technology, Government of India and Chairperson, Biotechnology Industry Research Assistance Council, a Government of India Enterprise)</i> .....	5
<b>BIOECONOMY 2020</b> .....	<b>6</b>
<i>Executive Summary</i> .....	6
<i>Overview</i> .....	7
<i>Insights</i> .....	10
BioEconomy's Contribution to GDP .....	11
Projections .....	13
<i>Size &amp; Structure</i> .....	15
<i>Segments</i> .....	16
Bt cotton .....	20
<i>Trends 2015-2020</i> .....	23
<b>COVID ECONOMY</b> .....	<b>26</b>
<i>Effective Testing</i> .....	26
<i>BioIndustrial, the Next Big Opportunity</i> .....	27
Sanitizers .....	27
Bioplastic: .....	27
BioFuels .....	28
<i>Vaccines</i> .....	29
<i>Diagnostics</i> .....	30
<b>START-UPS</b> .....	<b>32</b>
<i>Cumulative Base</i> .....	32
<i>New Registrations</i> .....	33
<b>BIRAC</b> .....	<b>36</b>
<i>Energizing the Start-up Ecosystem</i> .....	36
<i>Building the Innovation Ecosystem</i> .....	37
Start-up India – Make-in-India .....	37
Connect with BIRAC .....	37
<b>Association of Biotechnology Led Enterprises (ABLE)</b> .....	39

# FOREWORD

## Potential Unleashed



The year 2020 has been defined by a single word, the COVID-19 pandemic that brought unprecedented challenges to the country in every sphere. At the same time, for the biotechnology sector it was a moment of reckoning and it provided a great opportunity to unleash the full potential of innovation capacities to tackle the pandemic. The biotechnology sector took the pandemic in its stride and has come out stronger, providing confidence to the society in our country's innovation ecosystem strength.

The **India BioEconomy Report 2021 is being** brought out by the Biotechnology Industry Research Assistance Council (BIRAC), through its Make in India Cell and the Association of Biotechnology Led Enterprises (ABLE). The report indicates that the country's BioEconomy size has grown by more than 12.3 % in 2020 to reach \$ 70.2 billion. The BioEconomy in 2019 was \$ 62.5 billion. The increase in revenues have mainly happened in the biopharma segment. The share of BioEconomy in the national GDP too has been rising steadily in the last few years. The share now stands at 2.7 % against 2.2 % in 2019.

This happened due to several key initiatives of the Government in the past years and the Department of Biotechnology (DBT) has played a major role. One of the first acts after the national lockdown started in March 2020 was for the country to pool its resources and expertise through the formation of N-BRIC (National Biomedical Resources Indigenization Consortium). This helped to pool in all resources available nationally to introduce affordable diagnostics and testing kits, manufacture personal protection equipment (PPE) kits not just for national needs but also for exports. The launch of indigenous vaccine development efforts against COVID-19, and massive support in terms of policy, funding, removal of regulatory bottlenecks, eliminate

infrastructure hurdles etc., sped up vaccine development in an unprecedented manner.

I am happy to note that the collaboration between the government, biotech industry and research ecosystem overcame all hesitations in 2020 with the entire ecosystem fully engaged and involved in tackling national challenges.

All these factors have played a key role in the positive growth rate registered by India's BioEconomy. To illustrate, from few millions diagnostic tests a year, the nation conducted more than 16.5 crore COVID-19 tests using RT-PCR and Rapid Antigen tests in 2020, adding close to \$ 4 billion in revenues just from this one stream.

The innovation-led entrepreneurship continued despite the pandemic in 2020 and the BIRAC-ABLE report has recorded the emergence of 840 biotech startups in 2020 to take the total numbers to 4,237. About 61 % of these startups are in the biomedical segment including biopharma, medical technologies and diagnostics.

With two Made in India vaccines already in emergency use to vaccinate more than 1.1 crore citizens on priority and three more vaccines in the pipeline, I am confident that India's biotechnology segment will continue to grow stronger during 2021 too, by providing the most affordable health care solutions to the nation and the world, and achieve our target of \$150 billion bioeconomy by 2025.

**Dr. Renu Swarup**

*(Secretary, Department of Biotechnology Ministry of Science & Technology, Government of India and Chairperson, Biotechnology Industry Research Assistance Council, a Government of India Enterprise)*

# BIOECONOMY 2020

## Executive Summary

**"If favorable business environment is created, the biotechnology and healthcare sectors combined will be able to grow at a rate of 25-30% and have the potential to create \$150 billion BioEconomy by 2025." This was one of the triggers to launch the Indian BioEconomy Report (IBER) in 2019 by BIRAC in collaboration with ABLE and keep tracking the various performance indicators.**

This IBER report now has been the guiding force for a host of national policies, regulations, and directives set out to reach ambitious target of \$150 billion BioEconomy by 2025. Further, several states have begun to model their respective Biotechnology sectoral thrusts based on the national Indian BioEconomy Report (IBER).

The state governments are setting targets as a factor of national BioEconomy Values and as part of the Gross Domestic Gross State Domestic Product (GSDP) considerations. More about such examples will be shared in subsequent sections.

Covid-19 has changed the entire dynamics of the role of Biotechnology and modern medical diagnostics. With lockdowns, generally the businesses were affected and regular business models would have been relegated to defy the gravity. The study shows that sector has done well and didn't buckle down under pressure and record 12.3 percent growth.

### QUICK FACTS

BIOECONOMY  
VALUE: **\$70.2**  
BILLION

START-UPS: **4,237**

GDP: The growth in  
real GDP during  
2020-21 is **-7.7**  
percent %

Real GDP 2020-21:  
**₹134.40 lakh crore**

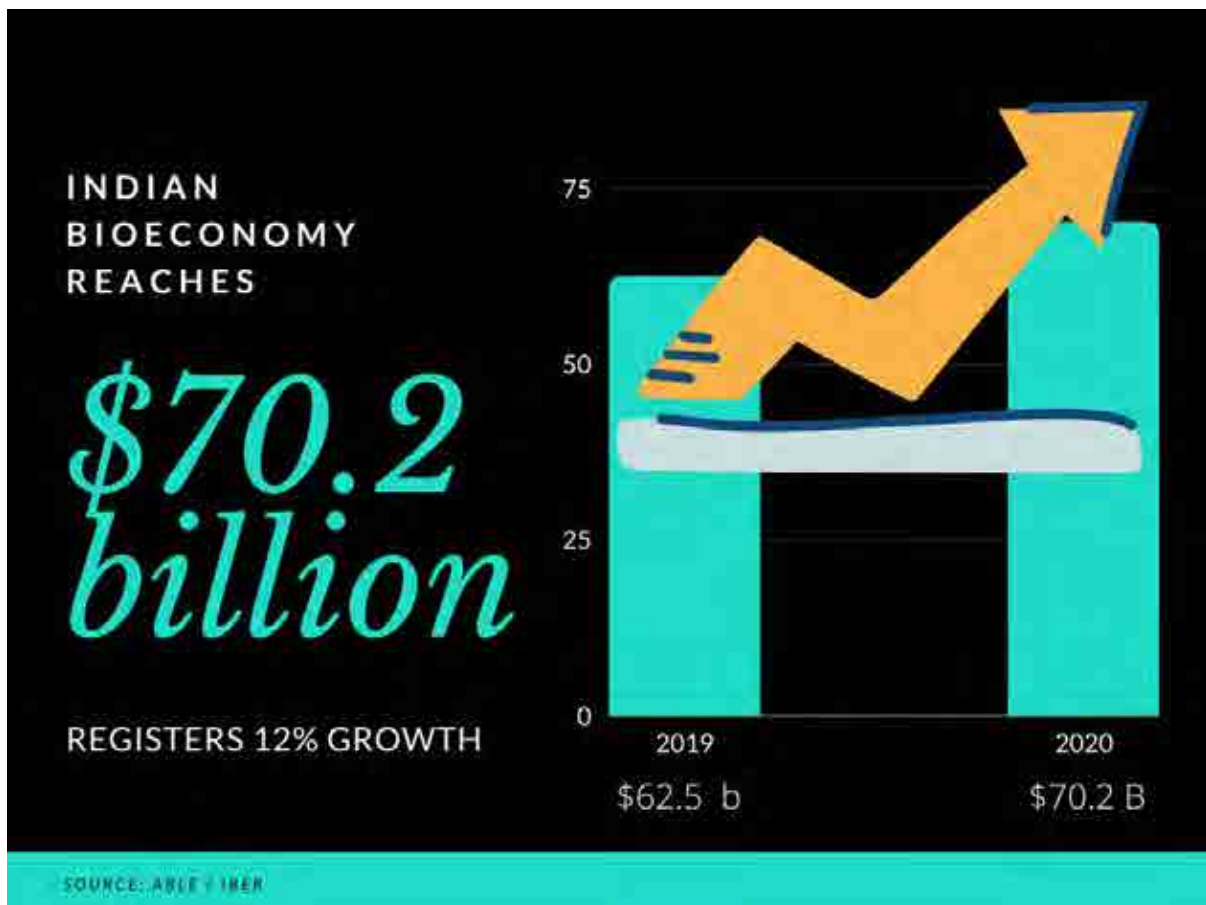
Nominal GDP:  
**₹194.82 lakh crore**

India's Cumulative  
Testing in Feb. 2021:  
**21.15 Crore ; 2400**  
testing labs

India's Cumulative  
Vaccination  
coverage has  
crossed **1.11 crore**

# Overview

India's BioEconomy by the end of calendar year 2020 was valued at \$70.2 Billion. India registered 12.3 percent growth in BioEconomy compared to the previous year's figure of \$62.5 billion.



**THIS IS A SIGNIFICANT MOMENT FOR** India's BioEconomy. Year 2020 was the year of Covid-19 crisis. Country-wide lockdown impacted several industries. Yet the Indian BioEconomy has seen many positives.

The bioscience-based industry's response to the Covid-19 Pandemic fight back is phenomenal. This didn't happen overnight. India's initiatives to deal with Covid-19 fructified due to the collective, concerted, and continuous efforts of the government (s), industry, academia, and incubators over the past few years. The comprehensive fight back was an embodiment of government's ethos of building a vibrant ecosystem.

Programs like **Startup India, Make-in-India, Atmanirbhar Bharat Abhiyan,** and **Ayushman Bharat** have been the fulcrum for a quick turnaround, which resulted in quickly repositioning and responding to the emergent situation.

India's achievements in biotechnology have found support from the government. The government through Department of Biotechnology (DBT) has been fostering the development of a strong biotechnology environment in the country. The Biotechnology Industry Research Assistance Council

(BIRAC), established under the Department of Biotechnology in 2012, is very proactively driving India's action plan towards a sustainable and robust bio-based economy.

BIRAC and the Prime Minister Shri Narendra Modi are playing a key role in helping the innovators and funders find the optimal platform in this direction. It is enabling an environment that helps take research ideas through proof-of-concept to market place. It has launched several pioneering schemes to build an entrepreneur-friendly ecosystem in the country. And Prime Minister Narendra Modi's emphasis on "**vocal for local**" is expected to only further strengthen its resolve.

**In 2020, India's BioEconomy was valued at \$70.2 billion. The industry ramped up its vaccine capabilities, scaled up Covid-19 testing, and looked beyond the normal opportunities to beat the Covid-19 economic stagnation.**

**India now has over 4,237 biotech start-ups, nearly a 25 percent jump in its base since 2019.**

**India's vision is to have 10,000 biotech start-ups by 2024 and be a \$150 billion BioEconomy by 2025 seems on course.**



Here are the key take ways from 2020.

**India's Biotech ecosystem of researchers and innovators has shown the way forward** in fighting pandemics. The sector played a key role in introducing low-cost diagnostics and testing kits; manufacturing Personal Protection Equipment (PPE), masks, and therapeutics; and ramping up clinical trials for Covid-19 vaccine, and setting up world-class facilities for manufacture and supply of Covid-19 vaccines.

**Collaboration was at its best and at unprecedented levels.** The collaboration between industry and academia overcame all usual hesitations. The entire ecosystem was very engaging and involved. Global and local collaborations with all stakeholders -- the governments, the accelerators, private and public sector partnerships, and start-ups -- prevailed under one roof.

In 2020 India **transformed from an importer to an exporting nation** of essential Covid-19 related products like diagnostic kits, PPEs, and vaccines

With lockdowns in place, Indian companies made rapid strides in ramping up **domestic production**. Indian companies geared up and repurposed themselves. Companies from auto industry, distilleries, and Information Technology sector, for example played, an important role in helping India meet the huge demand-supply gap for masks, PPE, ventilators, hand sanitizers, and diagnostics, ranging from Reverse transcription polymerase chain reaction (RT-PCR) to paper-based tests through indigenous production. Companies also played a significant role in accelerating digital health care.

India has played a very important role in global health and innovation. The pandemic has provided the country with an opportunity to play the lead role in the global biotech ecosystem. India is on a new path -- **from being the pharmacy of the world to being the hub of cutting-edge innovation and research.**

# Insights

**India's BioEconomy, in 2020, is valued at \$70.2 billion. This is 12.32 percent growth over 2019. The BioEconomy in 2019 was valued at \$62.5 Billion in 2019.**

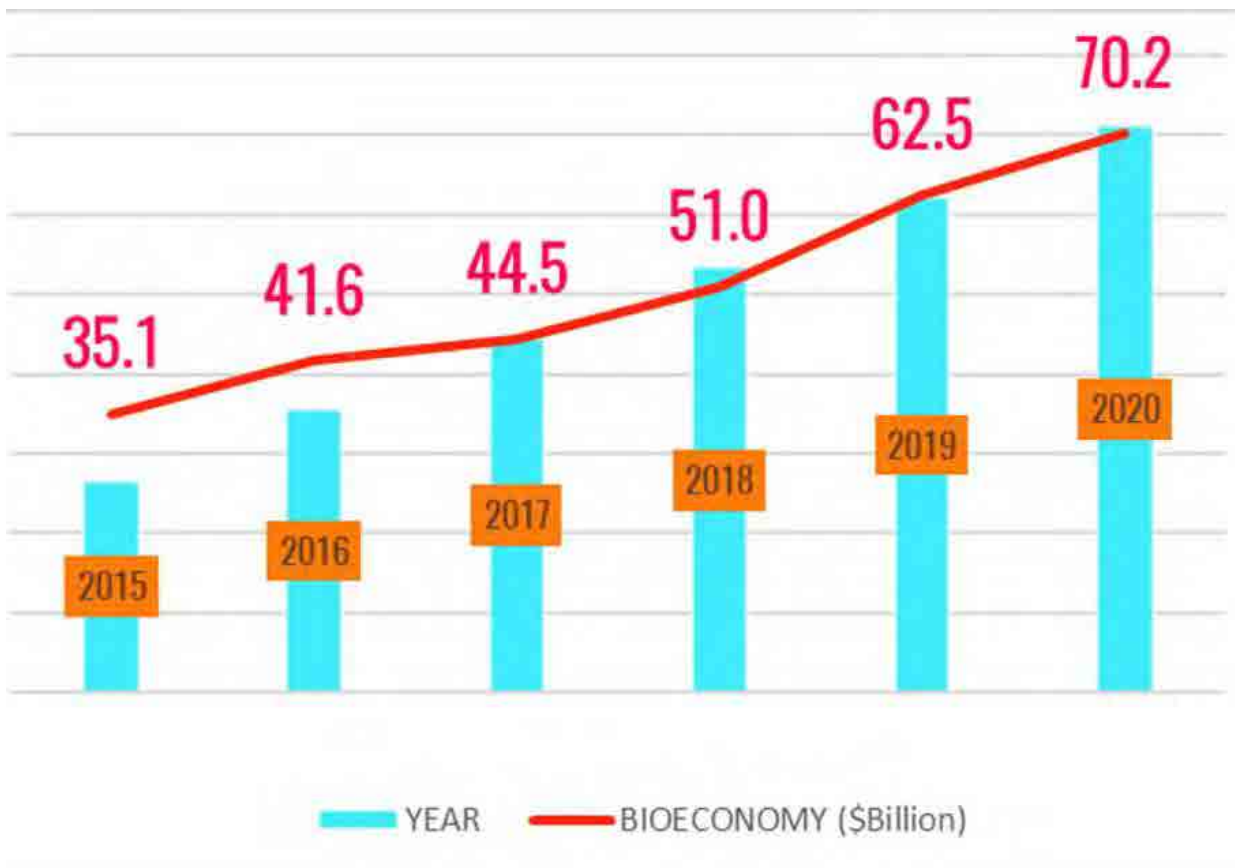
**IT IS A TREMENDOUS ACHIEVEMENT,** as India announced the Covid-19 lock down in March 2020. The entire industry was working in a regular fashion till end of December 2019. There were no signs of change in business tactics till January 2020. Starting March 2020 India had to revisit its entire healthcare focus.

The Indian industry had to prepare itself to work on multiple fronts. It needed to focus on diagnosing Covid-19; work on developing therapeutics; prepare for enhancing vaccine capabilities; engage

in digital health solutions; Accelerate product developments; Streamline and expedite regulation; Tackle emergency care and medical facilities; In summary India bioscience sector had to race against time.

There was confusion and uncertainty. Everything was fast paced. Today, almost a year after Covid-19 pandemic, the industry will be very happy with its performance.

India's Gross Domestic Product contracted by 7 percent and many



industries were impacted. In comparison, the BioEconomy of India has managed to register double digit growth and maintain its value creation.

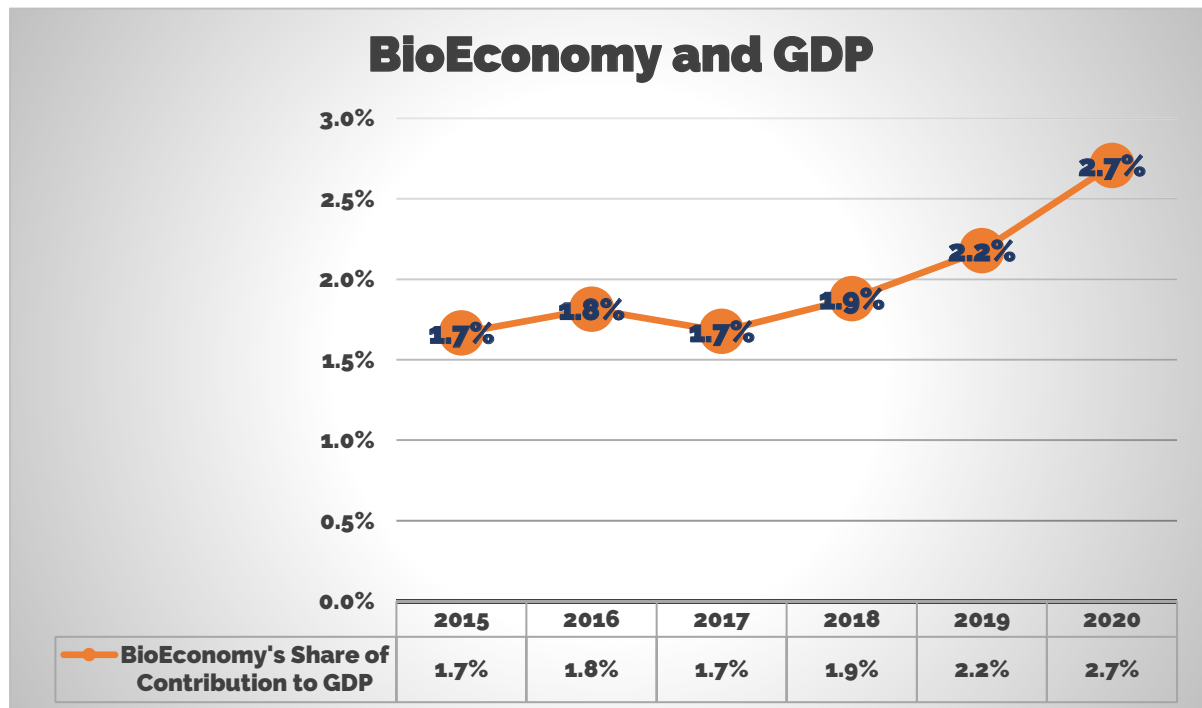
percent of countries are expected to experience a contraction in GDP per capita. India focused on saving lives and livelihoods by its willingness to take short-term pain for long-term gain.

The Economic Survey of India released in January 2021 highlights that Covid-19 pandemic is a "once-in-a-century" crisis. It is a unique recession where 90

India recognized that while GDP growth will recover from the temporary shock caused by the pandemic, human lives that are lost cannot be brought back.

### BioEconomy's Contribution to GDP

The national BioEconomy value stood at \$62.5 billion or about 2.2% of the national GDP (Gross Domestic Product) of \$2,800 billion (\$ 2.8 trillion) in 2019. The BioEconomy's contribution to the national GDP in 2020 is at 2.7% of the GDP of \$2593 billion (\$2.6 trillion) in 2020. In fact, BioEconomy's contribution to Indian GDP rises by 22 percent.



According to the IMF World Economic Outlook (October-2020), India's nominal GDP in 2020 is projected at \$2,593 billion at current prices. India's share of the world economy increased from 1.08 percent in 1993 to the current estimate of 3.28 percent in 2019.

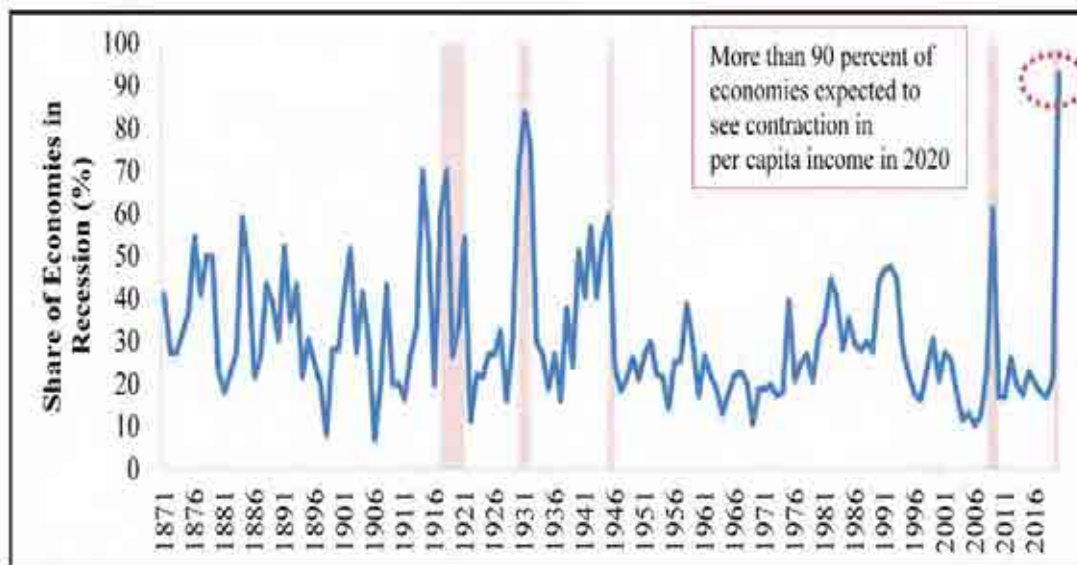
**GDP**

Real GDP or GDP at Constant Prices (2011-12) in the year 2020-21 is likely to attain a level of **₹134.40 lakh crore**, as against the Provisional Estimate of GDP for the year 2019-20 of ₹145.66 lakh crore, released on 31 May 2020.

**The growth in real GDP** during 2020-21 is estimated at -7.7per cent as compared to the growth rate of 4.2 per cent in 2019-20. Real GVA at Basic Prices is estimated at ₹123.39 lakh crore in 2020-21, as against ₹133.01 lakh crore in 2019-20, showing a contraction of 7.2percent.

**Nominal GDP or GDP** at Current Prices in the year 2020-21 is likely to attain a level of **₹194.82 lakh crore**, as against the Provisional Estimate of GDP for the year 2019-20 of ₹203.40 lakh crore, released on 31 May 2020. The growth in nominal GDP during 2020-21 is estimated at -4.2per cent.

Source: MOSPI



Source: World Bank

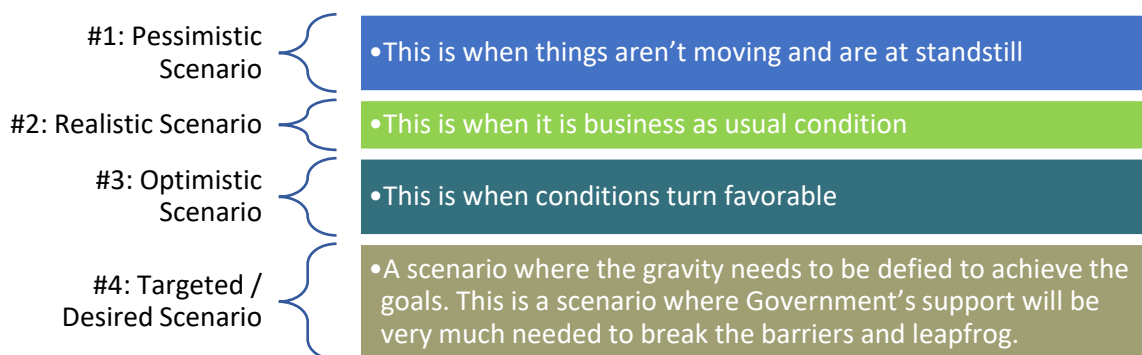
Note: Recession is defined here as contraction in per capita income

## Projections

- The BioEconomy is expected to bounce back in FY2022 but it is likely to grow at the rate of 14-16 percent between FY2022 and FY2025 according to conservative estimates.
- However, experts observing the scenario expect the industry to recover in FY2022 and grow at a CAGR of 10-12 percent between FY2022 and FY2025 and **reach \$100 billion** in value in business-as-usual situation.
- The optimistic view is that the BioEconomy will rebound faster and at an annual compounded growth rate of 12-15 percent reach **\$125 Billion**.
- To reach the **\$150 billion** by FY 2025, there has to be additional push ad stimulus. A case in point is the Covid-19 based BioEconomy. **In 2020, Covid-19's focus alone has resulted in over \$5 billion in value.**

### BIOECONOMY 2025 POTENTIAL

SCENARIO	CAGR	January 2025
Pessimistic	7-10%	\$95-105 Billion
Realistic	10-12%	\$105-115 Billion
Optimistic	13-15%	\$115-125 Billion
Targeted	15-20%	\$125-150 Billion



This report has taken into consideration four possible scenarios.

The Governments need to make strategic investments in select areas in order to reach the \$150 Billion BioEconomy target by end of 2024. **This can be done by creating new opportunities where industry can generate \$5-10 billion in additional revenues. There needs to be a push.**

- The Union government introduced Production-Linked Incentive (PLI) Scheme in in March 2020. The scheme was to provided companies in specific sectors incentives on incremental sales from products manufactured in domestic units.
- This is to encourage foreign companies to set shop in India and support domestic companies to establish new facilities or expand existing manufacturing units. The scheme for the Pharma and Medical Devices came into effect from July 2020. The PLI scheme witnessed good traction and this is now being extended to 10 more sectors including Food and Textiles.
- BioPharmaceuticals and Medical Devices Industry are two large segments of the BioEconomy. The two account for nearly 50-55 percent of the total contribution of the BioEconomy.
- BioAgriculture (Agriculture and Animal Husbandry) and BioIndustrial (Enzymes, BioFuels, Biomass, and Green Chemicals) industries are the other two segments.
- In order to reach the targeted goal of \$150 billion by 2025, few segments need to double their contributions. Agri is one such important segment. Also, Biofuels. The industry and Government can leverage the lessons from the Covid-19 crisis and work on similar winning strategies to grow the economy.

# Size & Structure

**Biotechnology industry is mostly focused on developing biotechnology products in healthcare, food and agriculture, and industrial and environment protection. BioEconomy is now a much broader concept and is becoming integral part of developmental strategies.**

## BIOECONOMY OR BIO-BASED

economy is a more recent phenomenon. Commonly accepted definition of BioEconomy is the production, utilization and conservation of biological resources, including related knowledge, science, technology, and innovation, to provide information, products, processes and services across all economic sectors aiming toward a sustainable economy.

Valuing of BioEconomy is complex. The focus is on three bio-based sectors of the economy. Industries can be part of multiple segments. BioEconomy is the sum of the primary bio-based production, secondary bio-based production, and the tertiary bio-based production.

**BioEconomy = Sector-A + Sector-B + Sector-C**

The basic value chain of biotechnology industry constitutes basic research, applied research, integration and development, production and manufacturing, testing and validation, marketing and sales, and post-

### BIO-BASED INDUSTRIES EXAMPLES

(Sector-A): Primary production of biomass, e.g., agriculture, forestry, animal husbandry, fishing, aquaculture

(Sector-B): Transformation of raw biomass, e.g., food and beverages industry, tobacco, textiles, wood, paper and pulp, pharma, footwear, etc.

(Sector-C): Transformation of processed biomass, e.g., restaurants, trade and transportation of bio-products

marketing services. It differs from segment to segment. The differences could be in volume-price aspects, potential advantage, product characteristics, and maturity.

The concept of value chain of a BioEconomy is seen as an approach to operationalize and meet sustainability development goals. A biomass, for example, would take into account the entire production process from biomass supply to use. In case of Industrial Biotechnology, the value chain would involve companies across industries like specialty chemicals, biofuels, bioenergy, bio-based plastics, other biomaterials, biolubricants, and biosurfactants

# Segments

The Indian biotech industry comprises of over 5,000 companies (760 core companies and 4,240 start-ups) and is aligned around five major segments: BioPharma, BioAgriculture, BioIndustrial, and combined segment of BioServices comprising of BioIT, CROs, and Research Services.

## THE KEY COMPONENTS OF THE BIOTECHNOLOGY SECTOR

BioPharmaceuticals & Diagnostics: Biologics and Biosimilars, Vaccines, Stemcell therapy, Molecular Diagnostics, Point-of-Care Diagnostics

BioAgri: Bt Cotton, Biomarkers, Biofertilizers and pesticides

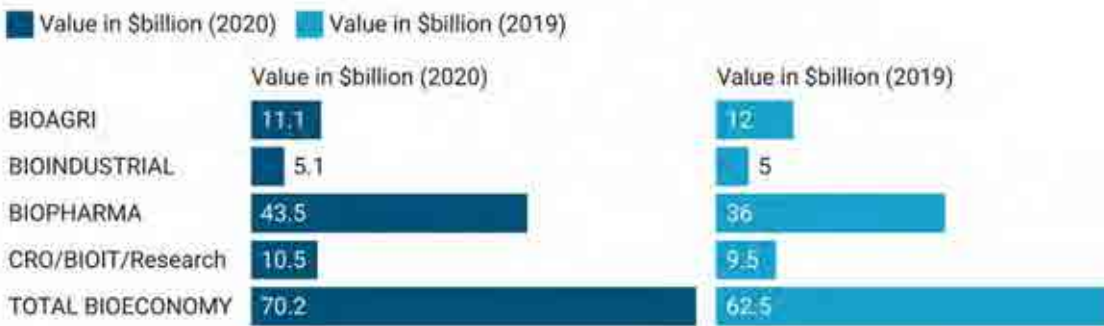
BioIndustrial: Enzymes, Biofuels, Biochemicals

Bioinformatics and BioIT Solutions: Artificial intelligence, Big Data, Computationally intensive Bioinformatics, Biostatistics, Systems Biology, Genomics, Proteomics, Transcript omics, Multi omics

Contract Research, Clinical Research, Contract Development: Drug discovery and drug development and manufacturing services including clinical data management

BioSuppliers: Providers of Single-Use Bioprocessing, High-Content Screening (HCS), Lab Data Management & Analysis Software, Lab Plasticware & Supplies, Microarray Analysis, Molecular Biology, Protein Biology, Sequencing, Clinical and Diagnostics science products, and Industrial applications

## [ BIOECONOMY BY SEGMENT ]



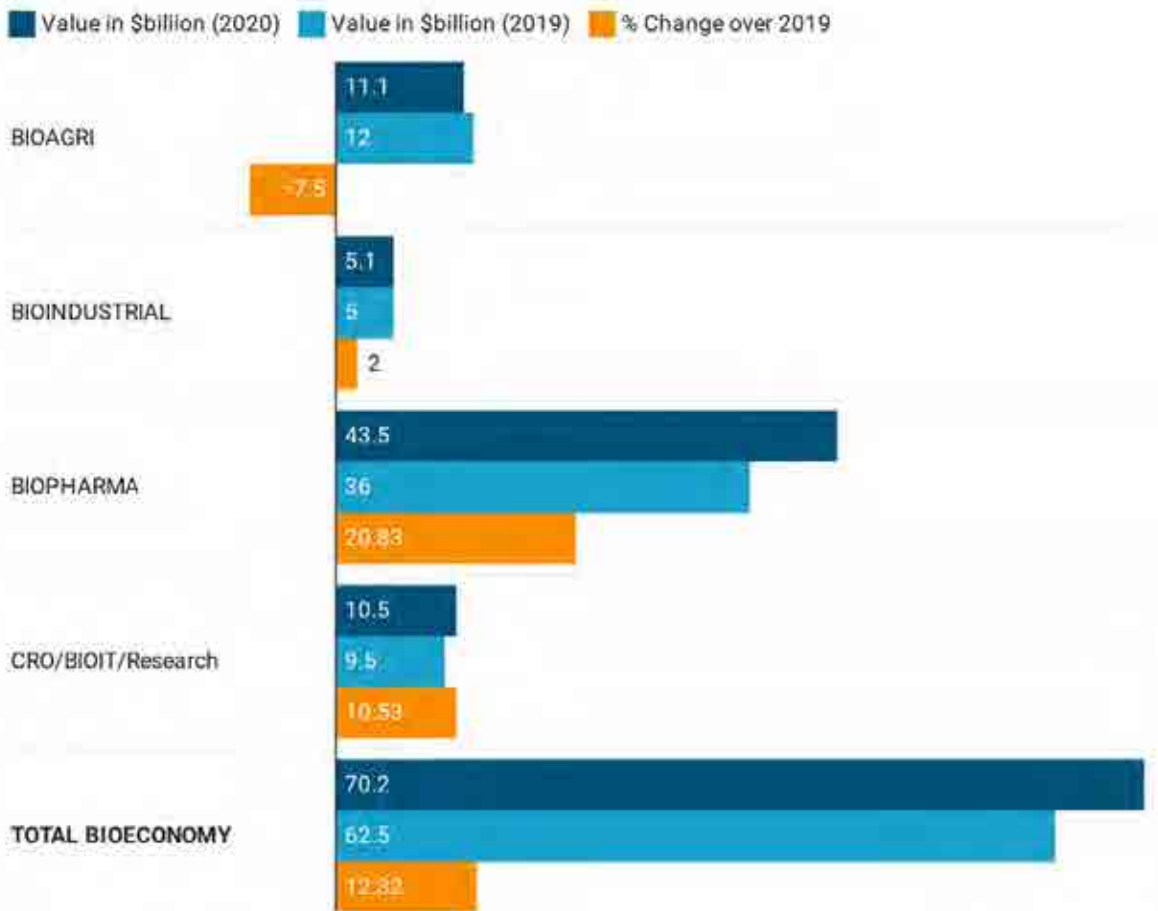
Source: Source: ABLE | IBER - Created with Datavrapper

From a good year in 2019, the Indian BioEconomy faced the most difficult times. In 2020 The economy was boosted by only by the good performance of the BioPharma and BioServices sectors.



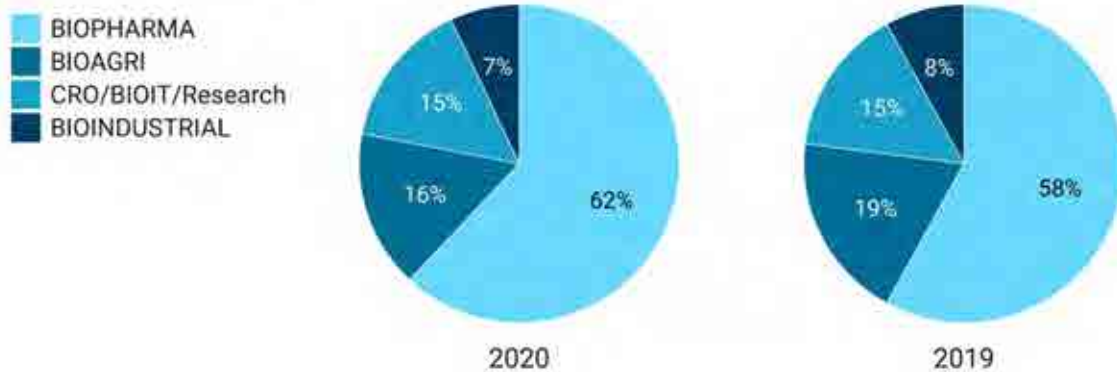
- The **BioPharma segment generated \$43.5 billion** in value, up by \$7.5 billion compared to last year's \$36 billion. This is that one segment that helped the industry from registering a drastic slow down.
- The next big segment is **BioAgri despite slight fall in revenue. The segment still contributed \$11.1 billion** in value.
- The **BioServices** recorded \$10.5 billion in value, while the **BioIndustrial** segment registered \$5.1 billion in value.

### [INDIA'S BIOECONOMY IN 2020]



Source: ABLE IBER 2021 • Created with Datawrapper

## [ SEGMENT SHARE ]

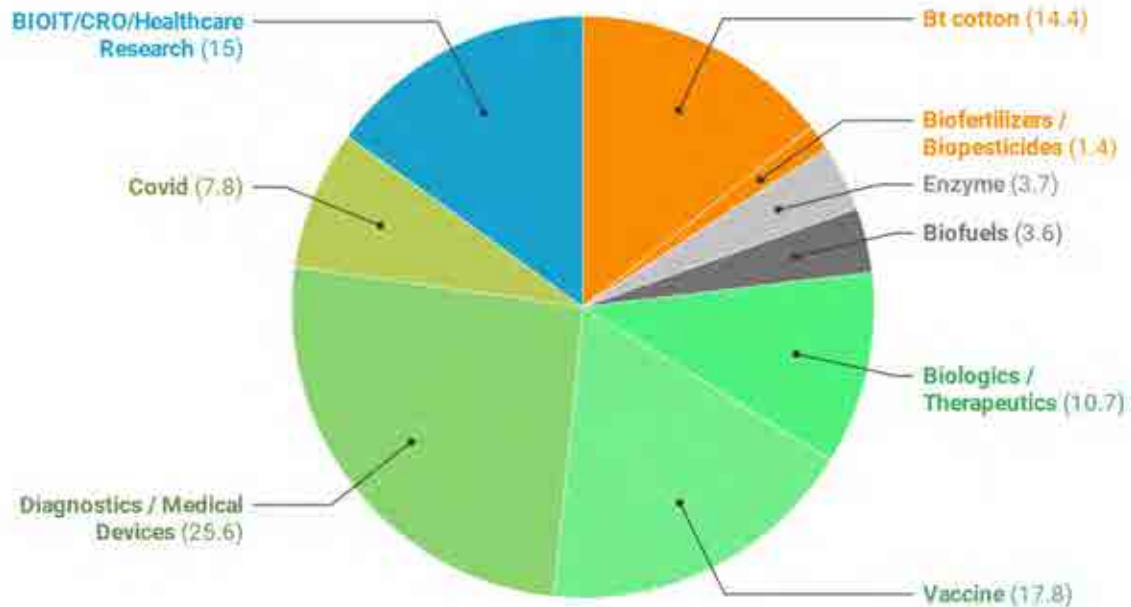


Source: Source: ABLE | IBER • Created with Datawrapper

- The BioEconomy continues to be driven by the **BioPharma** segment. It has **alone contributed to 62 percent share** of the total BioEconomy.
- The **BioAgri segment accounted for 16** percent share.
- The **BioServices segment's share was 15 percent** while the **BioIndustrial segment was at 8 percent** share. **Research services'** contribution to BioEconomy along with the BioIT and IT healthcare portfolio **is valued at \$10.5 billion**. This has grown from \$9.5 billion in 2019.
- Many biotech companies in India have research divisions and offer contract services. There are also some dedicated CROs offering the entire spectrum of services including contract discovery, development, and even manufacturing.
- **BioIndustrial segment** has also managed to reinvent and stay strong with \$5.1 billion. The sector accounted for nearly 7 percent share. The BioIndustrial segment has recorded 2 percent growth.
- While the enzymes business generated \$2.3 billion BioEconomy, the Biofuels accounted for \$2.8 billion BioEconomy

## [ KEY SUB-SEGMENTS ]

Figures are in % Share



The Total BioEconomy of India during 2019 was \$70.2 Billion. BioAgri, BioIndustrial, BioPharma, and Bio-based IT services like contract research, development, and research services are important classifications.

Created with Datawrapper.

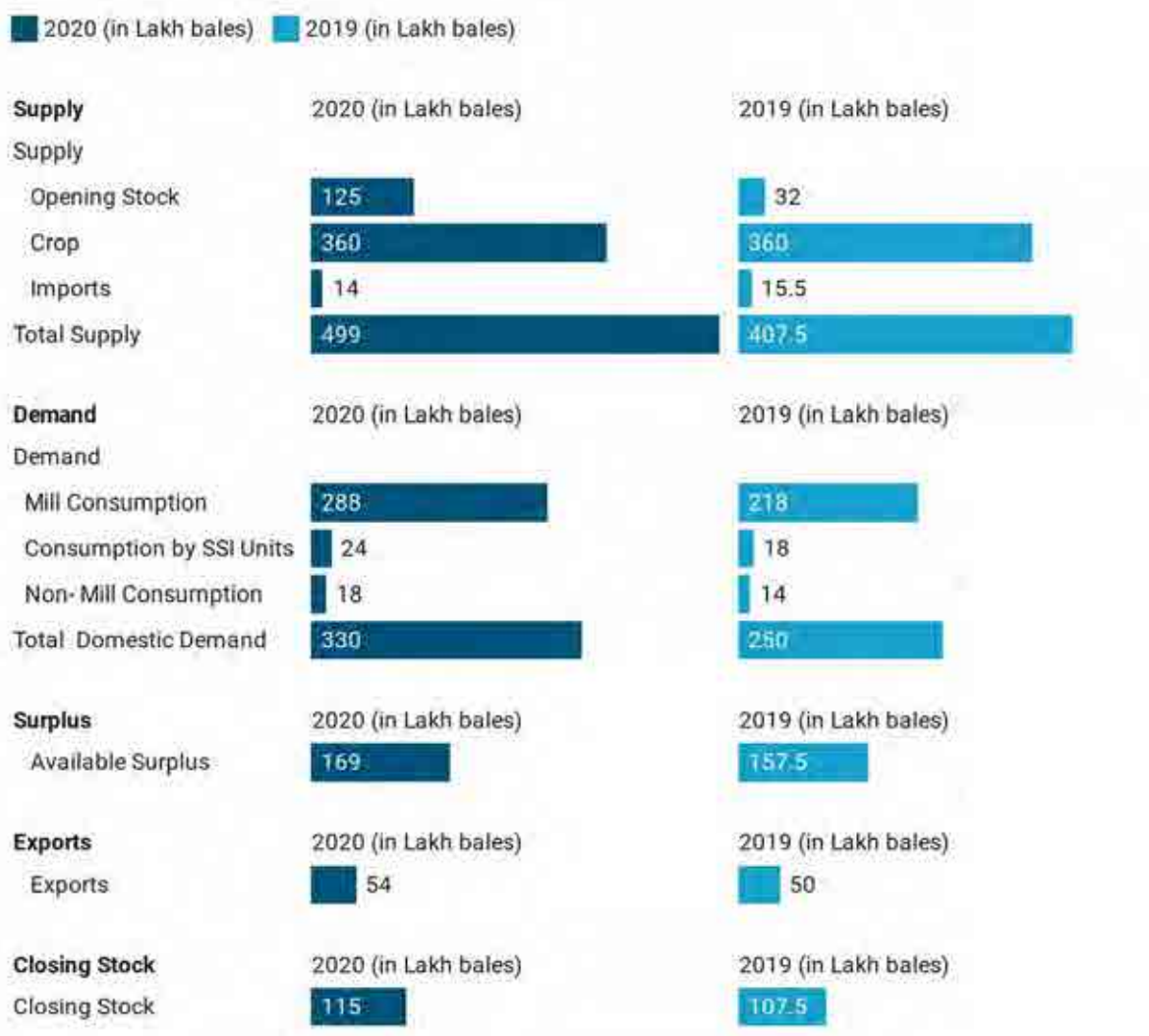
- The key sub-segments of the BioEconomy are biologics, biotherapeutics, vaccines, diagnostics, Bt Cotton, Biofertilizers and pesticides, the Enzymes, biofuels, BioIT and CRO segments.
- It will be interesting to note that the **Diagnostics and Medical devices segment accounted for nearly one-fourth** of BioEconomy's value.
- The **vaccines were the next big segment with 17.8 percent share**. CROs and Healthcare research services accounted for 15 percent share.
- **The Covid-19 related bioeconomic value created a 7.8 percent piece of the total BioEconomy pie.**

## Bt cotton

- Bt cotton was one of the segments that got hit by the lock down as the textiles sector was affected by the economic slow-down. Bt Cotton as an industry has reached the peak levels and nearly saturated at 94 percent cultivation.
- BioAgri, led by **Bt Cotton, witnessed a CAGR of 3 percent**. The reason for this is that India hit 94% adoption rate of Bt cotton according to ISAAA. The Bt cotton adoption rate in India has almost stabilized in the past five years at more or less 94%.
- Economic gains from biotech crops globally reached \$225 billion from 1996 to 2018. India's only biotech crop Bt Cotton has also reached the \$9 billion mark.
- According to ministry of Agriculture, procurement operations of seed cotton (Kapas) under Minimum Support Price in the states of Punjab, Haryana, Rajasthan, Madhya Pradesh, Maharashtra, Gujarat, Telangana, Andhra Pradesh, Odisha and Karnataka are in full swing. Till December 2020 a quantity of 90,08,018 cotton bales valuing Rs. 26,343.72 crore (\$ 3.6 billion) was procured benefitting 18,57,566 farmers.
- The productivity of cotton increased from 191 kg per hectare in 2002-03 to 477 kg per hectare in 2017-18 and the production of cotton has been increased from 8.62 million bales in 2002-03 to 34.89 million bales in 2017-18 due to adoption of Bt. cotton in the Country.
- The area under cotton cultivation in India in fiscal 2019-20 was 13.38 million hectares and cotton production were 35.7 million bales, according to the Ministry of Textile. The cotton area is estimated to be 13.33 million hectares in fiscal 2020-21 and cotton production is expected to be 36.0 million bales.
- After the COVID-19 pandemic (April 2020 to September 2020), Cotton Corporation of India has procured 20.71 lakh bales valued at ₹5615 crore.

- One of the simplest ways of arriving at the BioEconomic value of Cotton is based on MSP. The MSP is around Rs 5500 per bale. This value touches nearly 4 times when exported or procured domestically.

## [ Cotton Details]



INDIAN COTTON BALANCE SHEET FOR THE SEASON 2019-20 AND 2020-21

Source: Estimated as on 31st January 2021 Source: COTTON ASSOCIATION OF INDIA • Created with Datavrapper

- Experts believe farmers are in need of other biotech crops that will provide them profit and help improve their living status. In 2002 approval for the commercial release of Bt cotton hybrids/ varieties resistant to cotton bollworm was given.

## [ Cotton Trends ]

■ Area under cotton\* (in Lakh hectare) 
 ■ Area under Bt. cotton\*\* (in Lakh hectare) 
 ■ Production (in Lakh bales) 
 ■ Yield (kg per hectare) 
 ■ MSP Price per Bale 
 ■ MSP Revenue (in \$ Billion)

	Area under cotton* (in Lakh hectare)	Area under Bt. cotton** (in Lakh hectare)	Production (in Lakh bales)	Yield (kg per hectare)	MSP Price per Bale	MSP Revenue (in \$ Billion)
2010-11	111.23	96.32	330	499	2,750	3.38
2011-12	121.78	107.58	352	491	3,050	3.81
2012-13	119.77	105.43	342.2	486	3,750	4.1
2013-14	119.6	110.35	359.02	510	3,850	3.88
2014-15	128.19	119.4	348.05	462	3,900	3.77
2015-16	122.92	106.83	300.05	415	3,950	3.08
2016-17	108.28	89.43	325.77	511	4,010	3.31
2017-18	124.29	110.76	328.05	477	4,170	3.61
2018-19	126.58	117.81	287.08	386	5,300	3.7
2019-20	125.84	117.47	322.67	436	5,402.5	4.21
2020-21	125.84	117.47	360	486	5,670	4.68

\*Source: Directorate of Economics and Statistics \*\*Source: DAC&FW, State Governments and Directorate of Cotton Development, Nagpur \*\*\*First Advancement Estimate (Directorate of Economics and Statistics)

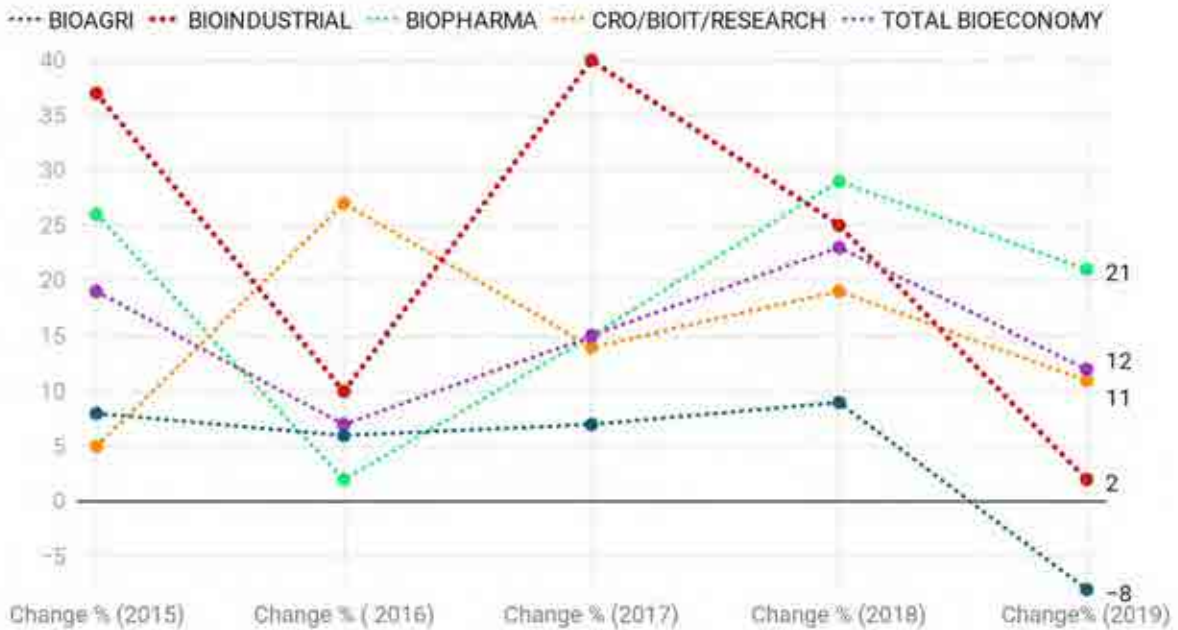
Source: Source: MSP Revenue by ABLE - Created with Datawrapper

- Bt Brinjal resistant to brinjal shoot fly developed by Mahyco in collaboration with University of Agricultural Sciences, Dharwad; Tamil Nadu Agricultural University, Coimbatore and ICAR-Indian Institute of Vegetable Research, Varanasi was approved by GEAC in 2009 but due to 10 years moratorium imposed on GM crops by the Technical Expert Committee (TEC) appointed by the Supreme Court of India no commercialization was taken up.
- In 2020, the Genetic Engineering Appraisal Committee (GEAC) under Ministry of Environment and Forests permitted biosafety research field trials of two new transgenic varieties of indigenously developed Bt Brinjal in eight states during 2020-23 only after taking no-objection certificate (NOC) from states concerned. These indigenous transgenic varieties of brinjal hybrids have been developed by the National Institute for Plant Biotechnology, lab under Indian Council of Agricultural Research (ICAR).

# Trends 2015-2020

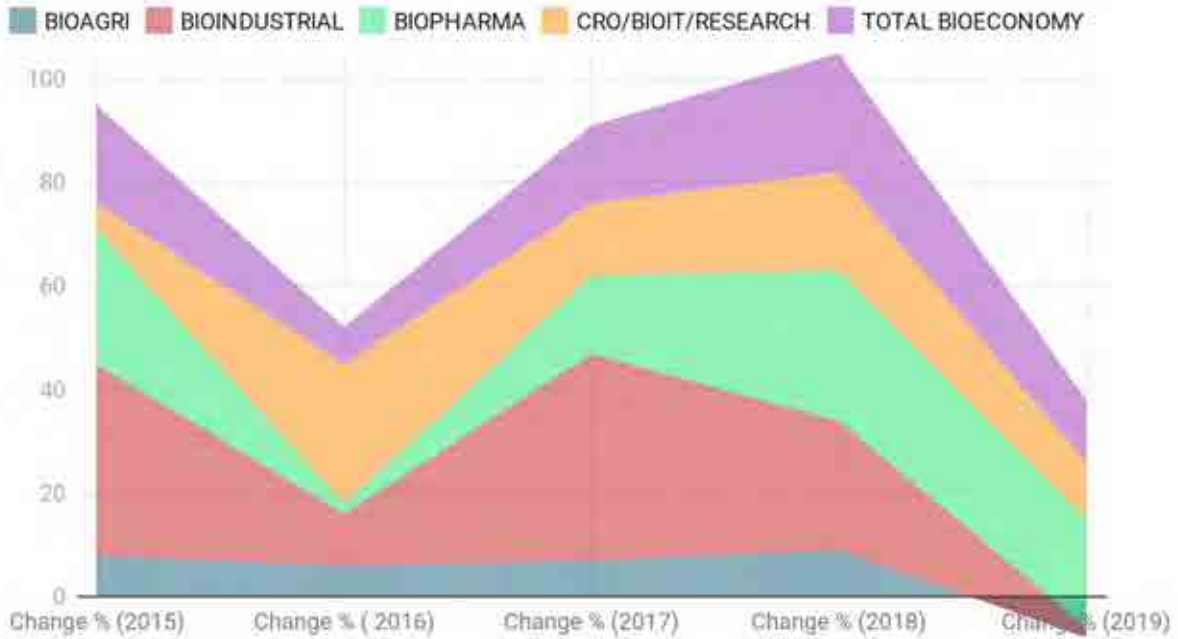


## [ GROWTH PATTERN ]



Source: ABLE IBER Report 2021 • Created with Datawrapper

### [ GROWTH PATTERN ]



Source: ABLE IBER Report 2021 • Created with Datawrapper

### [ CAGR MAP ]



Segment	CAGR
BIOAGRI	3
BIOINDUSTRIAL	15
BIOPHARMA	13
CRO/BIOIT/S	10
TOTAL BIOECONOMY	10

Source: ABLE IBER 2021 • Created with Datawrapper

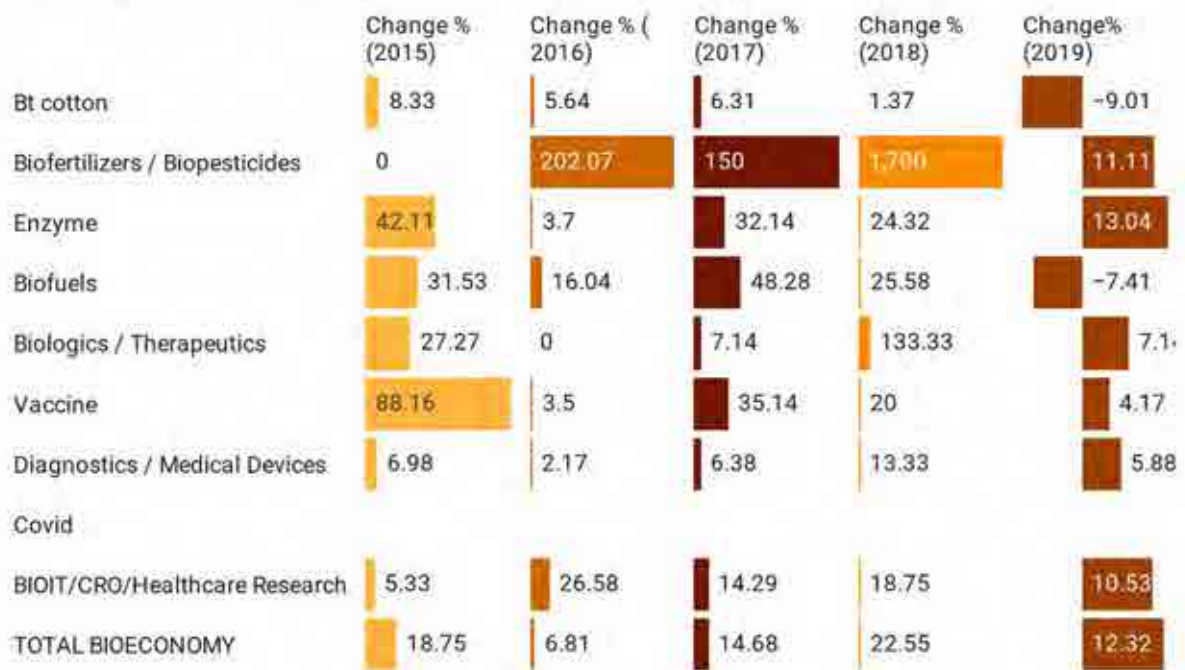


### [ CAGR ]



Created with Datawrapper.

### [ PERFORMANCE OF SUB-SEGMENTS ]



Source: ABLE/IBER 2021 - Created with Datawrapper

# COVID ECONOMY

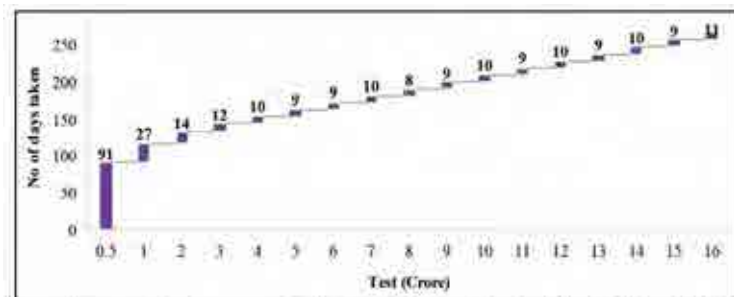
## Effective Testing

The 40-day lockdown period provided the necessary time to put in place the fundamentals of the '5 T' strategy - Test, Track, Trace, Treat, Technology.

As the first step towards timely identification, prompt isolation and effective treatment, higher testing was recognized as the effective strategy to limit the spread of infection.

At the onset of the pandemic in January, 2020, India did less than 100 Covid-19 tests per day at only one lab. However, within a year, 10 lakh tests were being conducted per day at 2305 laboratories. India reached a cumulative testing of more than 17 crore in January, 2021.

The sharp decline in the number of days to



Source: Data accessed from <https://www.Covid19india.org>; Ministry of Health and Family Welfare (MoHFW)

add the next cumulative 1 crore tests show the dedicated efforts to expand the testing infrastructure. The requisite resources of PPEs, masks and sanitizers were also expanded at a fast pace.

By the end of **December 2020, all states in the country have done over 165,000,000** Covid-19 tests with approximately 48% percent were based on the RT-PCR method, and 46 percent were based on the Rapid Antigen test. **At an average economic cost of Rs 1,500 per test, the Covid-19 testing alone has added nearly \$4 billion to the BioEconomy in 2020.**

In the case of **personal protection equipment (PPE)**, from almost zero production in the early part of 2020, the country is now producing 500,000 PPE kits daily. In the second half of 2020, the country's 600 + registered units produced around 250,000 PPE kits daily and large numbers were exported to even advanced nation like the US, UK, UAE and others bringing in significant revenues.

# BioIndustrial, the Next Big Opportunity

**BioFuels, BioPlastics, Biomass, and BioEnergy have seen strong push in 2020. Here are some case studies. The big news will arrive in 2022.**

## Sanitizers

Since March 2020, Indian distilleries were given permission to produce alcohol-based sanitizers to handle the COVID-19 pandemic.

The country ramped up its production capacity to nearly 3.2 million liters per day.

At least 910 distilleries were involved in the production of alcohol for sanitizers.



India produced nearly 3.5 million liters of Sanitizers by the end of October 2020. More than 60 percent of the

production has been consumed during 2020 and this stands at 2 million liters.

The average price per liter came down to nearly Rs 300 per liter during the pandemic season. The estimated turnover alone is to the tune of \$135 million. The economic value created in the whole chain is estimated to be \$350 million.

## Bioplastic:

India's bioplastics market is projected to grow at a CAGR of 23.91% to reach \$754.648 million by 2025 from \$208.475 million in 2019. Major market players are incentivized to enter this market.

The Government has announced that single-use plastics will be phased out by 2022.

This is also expected to open new opportunities for the Indian Bioplastics market and stimulate further growth.

## BioFuels

The total production of biodiesel in India as per Statista was 225 million liters in 2020. The revenue generated is roughly \$185 million. But the economic value would be around \$1.2 billion of just Biodiesel.

Then there is an entire segment of bio-based petrochemicals and biomass power. As per Ministry of New and Renewable Energy (MNRE) the national target is to achieve 10 GW of installed biomass power by 2022. India has a potential of about 18 GW of energy from Biomass.

The share of Biomass stands at 20.22%. An estimated 50 MMT (million metric tons) of liquid fuels are consumed annually in India, but with the actual biomass potential and its full utilization, India is capable of generating almost double that amount per annum according to experts.

The Ministry of Food, Consumer Affairs and Public Distribution has given in-principle approval to several sugar mills and standalone distilleries to avail loans for capacity addition to enhance and augment the ethanol production capacity. And the total permitted capacity is more than 20921 KLPD by October 2020. More than 275 distilleries were allowed to start new capacities

# Vaccines

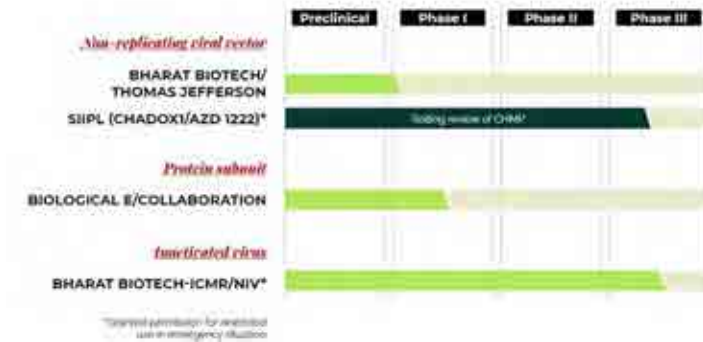
Indian companies are setting up facilities for nearly 5.5 billion doses of Covid-19 vaccines by 2021.

The estimated investments are to the tune of Rs 1650 crore (\$250 million). The procurement cost by the GAVI alliance for Covid-19 vaccine will be Rs 250 (\$3). At that rate Indian companies will supply vaccines valued at nearly Rs 123,750 crore (\$16.5 billion). This price globally will be nearly \$20 according to some estimates.

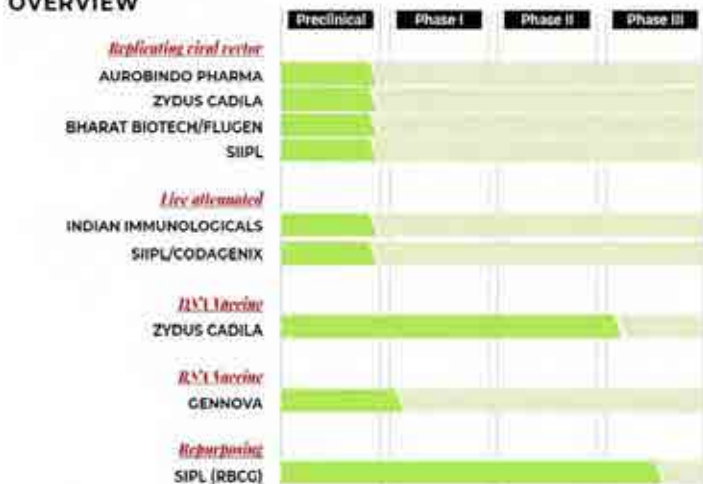
There is an opportunity in cold storage as well. The current capacity as per the immunization program is nearly for 600 million doses and the cold chain infrastructure of the private sector is for 250-300 million doses.

The gap is for another 550-600 million doses annually.

## R&D PIPELINE: OVERVIEW



## R&D PIPELINE: OVERVIEW



Candidate	Scale-up feasibility	Delivery feasibility	Company Experience	Existing Dose Commitment
SIPL (CHADOX1/AZD 1222)	No non-replicating viral vector vaccine licensed in India	2 doses, IM, 2-8 degree C	WHO PQ, supplying vaccine globally - NBA by ANVISA, INVIMA, SAHPRA, NCS	100 million doses committed to GAVI
Biological E (protein subunit)	Established platform	2 doses, IM, 2-8 degree C	WHO PQ facilities, FDA, EMA approved DP facilities	Min 21% of annual production to GAVI eligible countries, and 40% to India
Bharat Biotech-ICMR/NIV	Need for BSL-3 facilities	2 doses, IM and ID	WHO PQ facilities, Have BSL-3 facilities	MoU with ICMR states priority to provide vaccine to Govt
Zydus Cadila (DNA)	Time to manufacture a risk as facility under development, regulatory clearance needs clarity	Potential barriers to uptake due to ID, admin, and/or need for delivery device	WHO PQ facilities	No
Genova (5a mRNA)		2 doses, IM, 2-8 degree C	First vaccine to be commercialised, Strong in biopharmaceutics	No

# Diagnostics

## RESEARCH CONSORTIUM

Develop **biomedical tools** for prevention, identification and treatment to combat the through considering a **Interventions** holistic approach



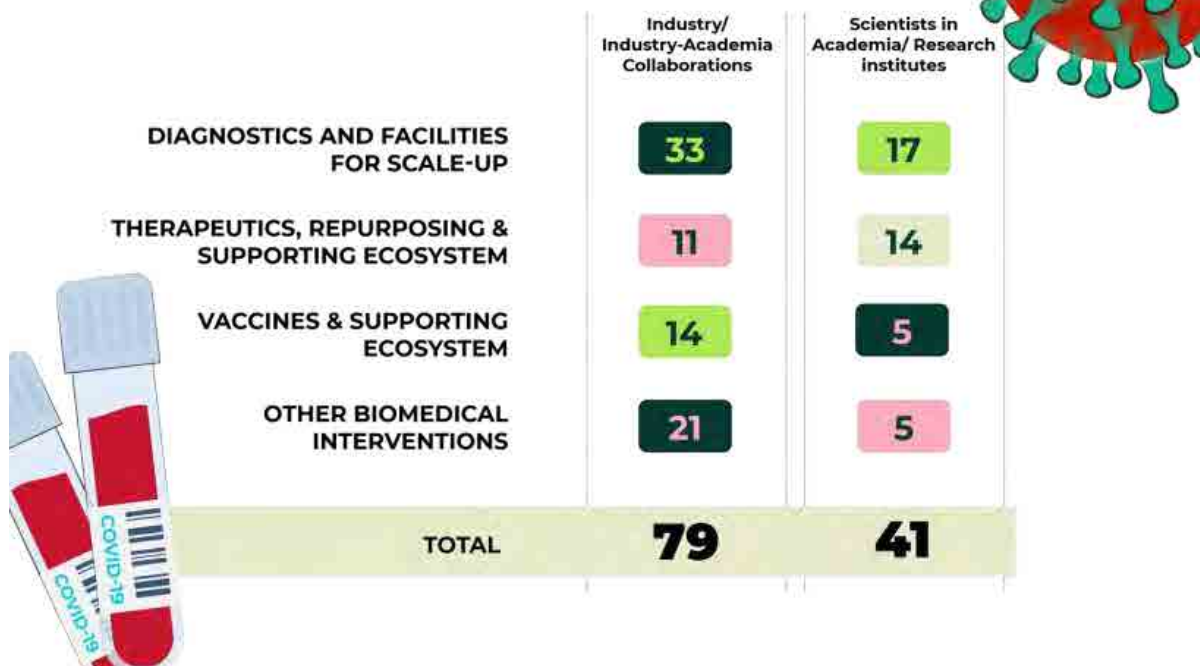
**Diagnostics** Other epidemic addressing critical



of **COVID-19** roadblocks

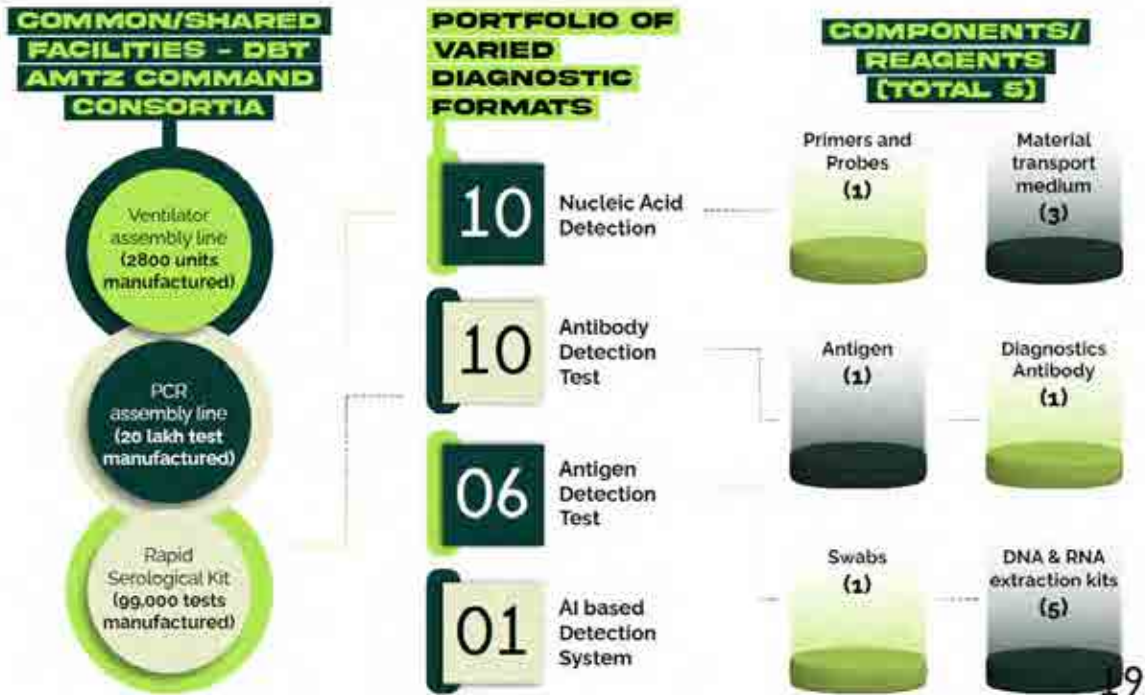
<p><b>TESTING</b></p> <ul style="list-style-type: none"> <li>• Development of molecular and serological tests</li> <li>• Development of novel diagnostics</li> <li>• Testing Hubs</li> <li>• Mobile I-Lab</li> </ul>	<p><b>TREATMENT</b></p> <ul style="list-style-type: none"> <li>• Plasma therapy</li> <li>• Monoclonal antibodies</li> <li>• Drug re-purposing efforts</li> <li>• DBT-AYUSH Phyto-pharmaceuticals</li> </ul>	<p><b>GENOMICS</b></p> <ul style="list-style-type: none"> <li>• PAN-India 1000 SARS-COV-2 RNA genome sequencing successfully completed by DBT AI consortium</li> <li>• Nasal microbiome study - Useful for epidemiological studies</li> </ul>
<p><b>PREVENTION</b></p> <ul style="list-style-type: none"> <li>• BCG Trial</li> <li>• Multiple vaccine platforms</li> <li>• Assays and animal models</li> <li>• Clinical Trial sites</li> <li>• Immunoassay lab</li> </ul>	<p><b>FACILITATING THE ECOSYSTEM</b></p> <ul style="list-style-type: none"> <li>• 5 COVID -19 Bio-repositories</li> <li>• Indigenization of Resources</li> <li>• Validation Centres</li> <li>• Rapid Regulatory Framework</li> </ul>	<p><b>OTHER INTERVENTIONS</b></p> <ul style="list-style-type: none"> <li>• Scaling up of manufacturing-ventilators, PPE, Screening and monitoring devices, disinfection and sterilization platforms</li> </ul>

## SUPPORT UNDER COVID-19 RESEARCH CONSORTIUM



Source: DBT

## COVID-19 CONSORTIUM DIAGNOSTICS PROJECT PORTFOLIO



## ENSURING SELF-RELIANCE FOR BIOMANUFACTURING



**NBRIC**  
A Make-in-India Initiative

**NATIONAL BIOMEDICAL RESOURCE  
INDIGENISATION CONSORTIUM**

A Platform for

# Aatmanirbhar Bharat

NBRIC is a nation-wide effort for convergence of indigenous resources, products and services towards developing diagnostics, vaccines and therapeutics for COVID-19 and beyond for self-reliance in India's biomedical capabilities.



# START-UPS

India's biotech start-ups base (i.e., total number of companies registered since 2010) continued to grow in 2020 as well. The country's total biotech start-up base has expanded to 4,237 companies. The base grew from 3,397 companies in 2019. The start-up base witnessed a 25 percent jump. The term "Cumulative" mentioned in the graphs and paragraphs below means the total base. The term used for companies formed in a specific year is "New Start-ups".

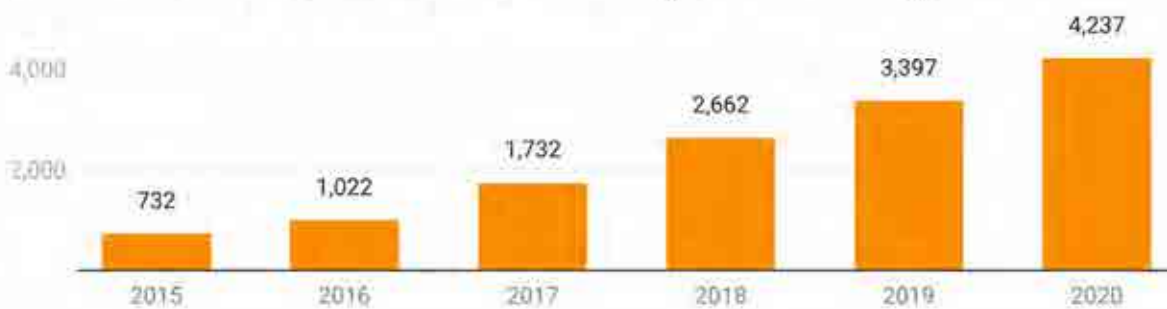
## Cumulative Base

### TOTAL BIOTECH START-UPS IN 2020



Created with Datawrapper

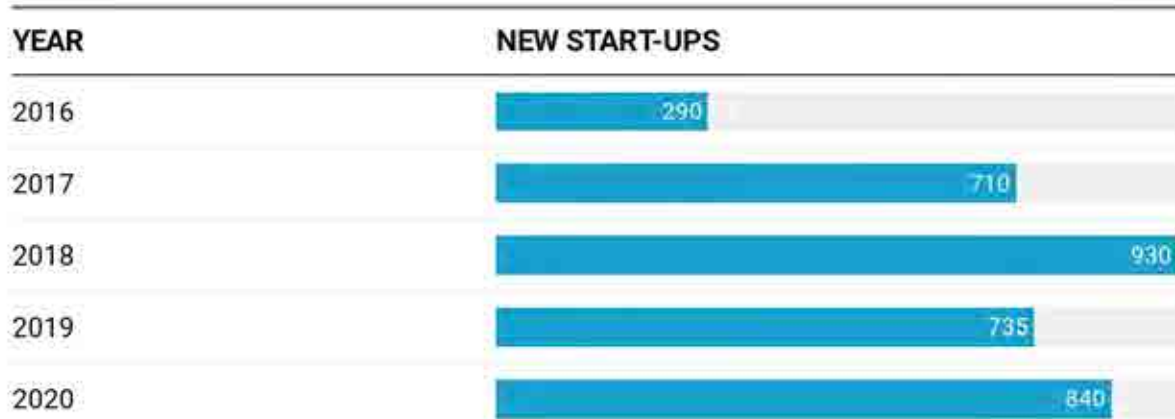
### [ CUMULATIVE START-UPS BASE (2016 - 2020) ]



Created with Datawrapper

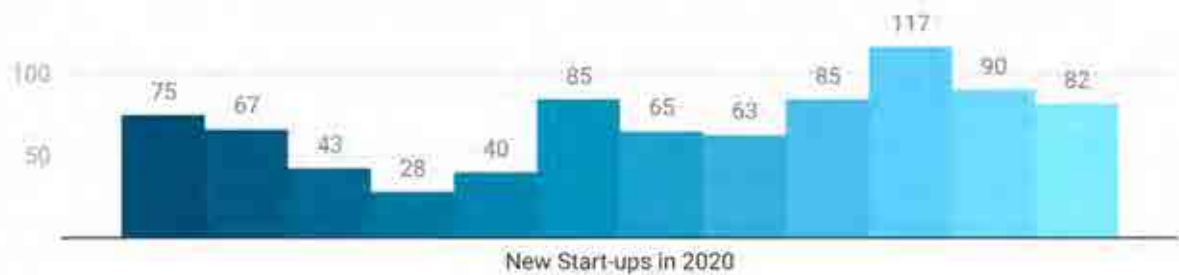


# New Registrations



## [ NEW START-UPS MONTH-WISE ]

■ January 
 ■ February 
 ■ March 
 ■ April 
 ■ May 
 ■ June 
 ■ July 
 ■ August 
 ■ September 
 ■ October 
 ■ November 
 ■ December



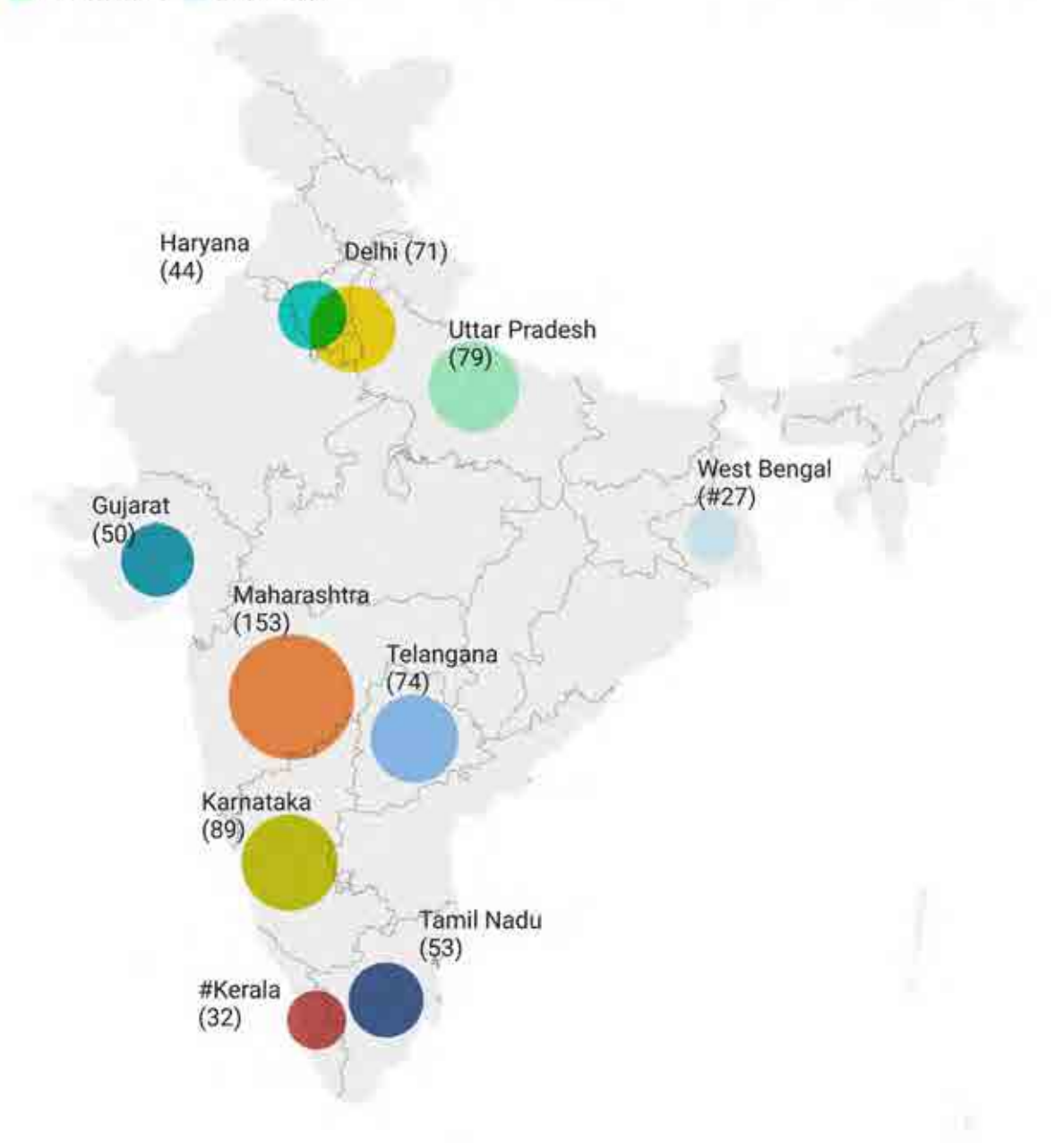
*It has been observed that the number of registrations are high during September to December months. The average monthly registrations were hovering around 70*

Chart: Source: ABLEIBER • Created with Datawrapper

## [NEW START-UPS IN 2020] TOP 10 STATES

Where did the start-ups register in 2020?

Maharashtra witnessed the largest number of new registrations in 2020. It was followed by Karnataka, Uttar Pradesh, Telangana, Delhi, Tamil Nadu, Gujarat, Haryana, Kerala, and West Bengal.



#1 Maharashtra (18.2%), #2 Karnataka (10.6%), #3 Uttar Pradesh (9.4%), #4 Telangana (8.8%), #5 Delhi (8.5%), #6 Tamil Nadu (6.3%), #7 Gujarat (5.9%), #8 Haryana (5.2%), #9 Kerala (3.8%), #10 West Bengal (3.2%) Others (20.1%).  
Total New Start-ups: 840

Source: Source: ABLE IBER - Map data: © OSM - Created with Datawrapper

## [ NEW START-UPS SEGMENT WISE ]

	2020	2019	2018	2017	2016
BioPharma (including biomedical and diagnostics)	515	495	505	485	170
BioAgri (Bt cotton, Smart Agri, Biofertilizers, Stimulants)	90	50	95	45	28
BioIndustrial (including energy)	105	95	90	15	25
BioIT / Big Data / IOT	55	50	80	40	40
BioResearch Services	75	45	160	125	27
<b>TOTALS</b>	<b>840</b>	<b>735</b>	<b>930</b>	<b>710</b>	<b>290</b>

Created with Datawrapper

## KEY PEOPLE TRENDS

- 1 There are nearly 2 women in a Board of five.

---

- 2 Nearly 1 lakh people have been employed by these start-ups since 2010.

---

- 3 Average start-up has about 6-10 people at launch.

---

- 4 Nearly 38% of the people employed are women.

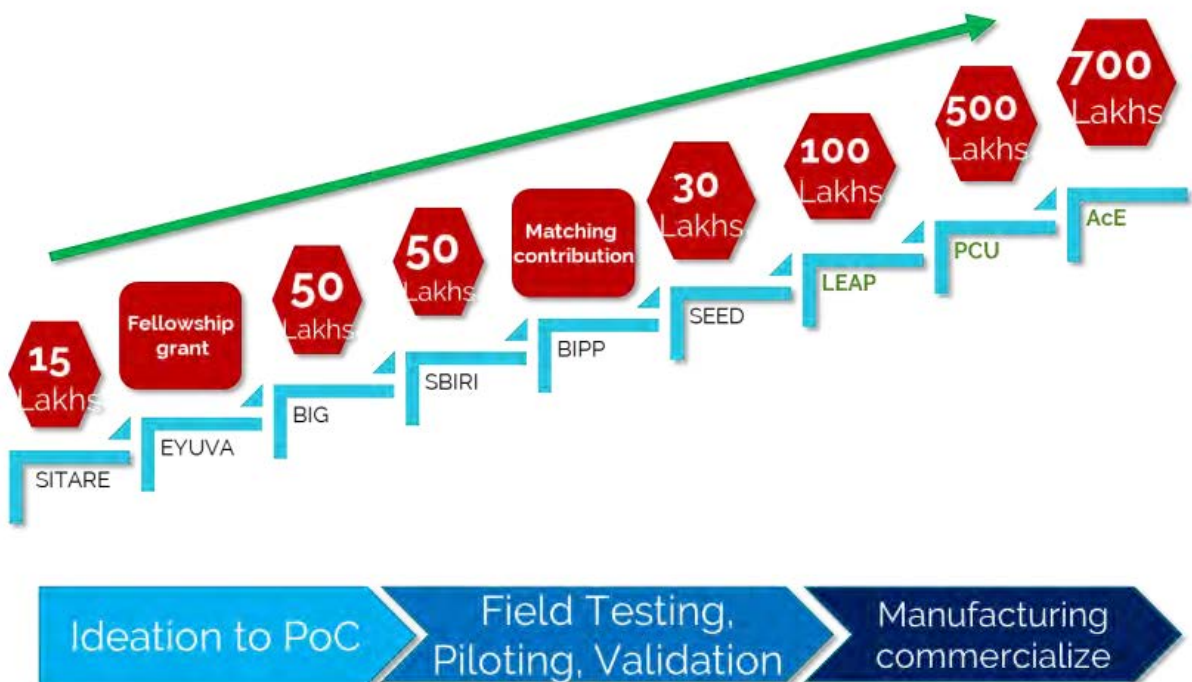
---

- 5 Average age of the founders has been 39. More and more young people are starting companies. Nearly 6% of the start-ups were founded by fresh graduates.



# Energizing the Start-up Ecosystem

## Up to 1 Million USD Funding



*Funding, Capacity building, Incubation space, Mentorship, Field testing, Validation, Compliances, Stakeholders connect, Angels/VCs, International opportunities, Policy initiatives, PPP for "Pull" Partnership, Mission programs*

# Building the Innovation Ecosystem

## Start-up India – Make-in-India



### STARTUP SOLUTIONS



## Connect with BIRAC

### CONTACT US

Global Bio-India Secretariat  
Make in India Cell  
Biotechnology Industry Research Assistance Council

1st Floor, MTNL Building,  
9, CGO Complex, Lodhi Road,  
New Delhi-110003

Phone No. **+91-11-45771000**

WEBSITE: [www.globalbioindia.com](http://www.globalbioindia.com)

E-MAIL: [info@globalbioindia.com](mailto:info@globalbioindia.com)

FACEBOOK and LINKEDIN: [GlobalBioIndia](#)

TWITTER: [@GlobalBioIndia](#)

**MAKE IN INDIA CELL - BIOTECHNOLOGY**

Outreach activities include:
 

- Organization of Major Market Events (India Bio-India 2017)
- Organization of Investor Technology & Market & International Launch Events
- Organization of Investor Meet, BIRAC's access through
- Technical Network etc. (Lab & Market Publications) / Regular Assessment of BIRAC's Impact





## Association of Biotechnology Led Enterprises (ABLE)

Founded in 2003, India's leading biotechnology industry organization, ABLE has been engaging the members and key stakeholders in the biotech community to raise the country's efforts in the direction of a robust bio-based BioEconomy since the concept of was first enunciated in 2012.

It is important that we have two key traits in the national BioEconomy Strategy.

1. A system to incorporate and action the suggestions and recommendations after due deliberations and;
2. A system to measure, monitor, analyze and record the benefits of the BioEconomy system.

### WHERE WILL WE BE IN 2025?

ABLE's Goal and Vision for 2025 is:

- A \$150 billion thriving BioEconomy by 2025.
- 10 million jobs driving the BioEconomy led by products and services
- Delivering affordable access to global healthcare through high quality, cost competitive Biological medicines, vaccines and diagnostics.
- Providing access to high value medical treatments in emerging areas like gene therapy, vein to vein cell therapy and stem cells therapy
- Producing high tech agricultural products that are high yielding & environmentally sustainable
- Adopting bioremediation, enzyme technologies' and biofuels to reduce the carbon footprint and build a green future for India.
- An innovation engine to improve the lives of people in India and around the world.

ABLE can be reached at [www.ableindia.in](http://www.ableindia.in) for suggestions, inputs and support to this national endeavor.



**FOR FURTHER INFORMATION  
PLEASE CONTACT:**

**Make In India Facilitation Cell for Biotechnology**

**Biotechnology Industry Research  
Assistance Council**

1st Floor, MTNL Building, 9, CGO Complex,  
Lodhi Road, New Delhi-110003  
Phone: 011-24389600 Fax: 011-24389611  
E-mail: [birac.dbt@nic.in](mailto:birac.dbt@nic.in)  
Website: [www.birac.nic.in](http://www.birac.nic.in)  
Twitter: @BIRAC\_2012