

## **INDIA'S SUSTAINED GROWTH IN BIO-ECONOMY**



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### **Introduction**

In the past 8 years, India's Bio-Economy has grown almost tenfold and **currently stands at US \$ 80 Bn.** In the next 8 years, it is expected to nearly quadruple and reach US\$ 300 Bn. Stretching over crucial sectors like pharmaceuticals, agriculture, bio-industry, bio-IT, and bio-services, India's biotechnology industry holds the potential to revolutionize the country's economy and is rightly regarded as **'India's Sunrise Sector'**.

The COVID-19 pandemic provided a major boost to India's Bio-Economy and has placed the country as a leading destination for R&D and manufacturing. Having spent more than US\$ 1 Bn on R&D in 2021, India has led the fight against COVID-19 on the forefront. India has made a remarkable progress in creating a conducive environment for innovation in the biotechnology industry, housing more than 5300 biotech start-ups in the country as in 2022.

### **What Is the Bioeconomy?**

According to the United Nations Food and Agriculture Organisation (FAO), the bioeconomy is "**the production, use and conservation of biological resources, including related knowledge, science, technology, and innovation to provide information, products, processes and services to all economic sectors with the aim of moving towards a sustainable economy**".

The term bioeconomy became popular in the first decade of the 21st century following its adoption by the European Union (EU) and the Organisation for Economic Co-operation and Development (OECD) as a framework for promoting the use of biotechnology to develop new products and markets. Since then, **both the EU and the OECD have implemented specific bioeconomy policies.**

For example, the EU Bioeconomy Strategy covers all the sectors and systems that depend on biological resources: **animals, plants, micro-organisms and derived biomass, including organic waste.** The ultimate aim is to protect the environment, avoid [overexploitation of natural resources](#) and enhance [biodiversity](#).

### The circular bioeconomy

The bioeconomy aims to drive both sustainable development and circularity. In particular, the principles of the circular economy — reuse, repair and recycle — are a fundamental part of the bioeconomy. Through reuse, repair and recycling, the total amount of waste and its impact is reduced. It also saves energy, minimizes pollution of soil, air and water, thus helping to prevent damage to the environment, climate and biodiversity.



## Why do we need a sustainable and circular bioeconomy?

**Global challenges** such as climate change and ecosystem degradation, along with growing demands for food and energy, force us to find **new ways of producing and consuming** in a world of finite resources.

The bioeconomy has enormous potential for...



### Job creation

Create millions of green jobs, especially in rural and coastal areas.



**Renewal and modernisation of the industrial fabric**  
Introduce innovations in agriculture, aquaculture, forestry and other industries.



### Climate mitigation and carbon neutrality

Reduce atmospheric emissions and our dependence on fossil resources.



**Ecosystem and biodiversity restoration**  
Aligned with the SDGs, recover part of the degraded ecosystems.

### Examples of bioeconomy

**Food systems occupy the largest niche in the bioeconomy.** To these systems, which include [sustainable agriculture](#), [sustainable fishing](#), forestry and aquaculture, as well as food and feed manufacturing, are added bio-based products and bioenergy. Bio-based products include bioplastics, [biodegradable clothing](#) and other products related with [eco-design](#). Like biomass — one of the [renewable energies](#) —, bioenergy improves the security of energy supply, reduces energy dependence and creates new opportunities for growth and employment.

### How to boost the Bioeconomy?

An appropriate bioeconomic strategy requires the development of an action plan involving local governments, national governments and supranational organisations. In order to promote such a plan, a political framework that promotes [multilateralism](#) and enables joint efforts is needed. We review the guidelines to be followed below:

- **Increased investment in research, innovation and training.** Research on bioeconomy issues and its application tend to be disconnected. To avoid this, public-private partnerships should be promoted.
- **Strengthening policy coordination and engagement.** Increasing synergies and coherence between bioeconomy-related policies, initiatives and economic sectors is essential.
- **Improving markets and competitiveness.** This consists of providing the knowledge base needed to make the different sectors of the bioeconomy more sustainable, as well as boosting the development of clean energy.

### The bioeconomy, the 2030 Agenda and the SDGs

The [2030 Agenda](#) was adopted by the United Nations (UN) in 2015. This action plan encompasses the [17 Sustainable Development Goals \(SDGs\)](#) and although all of these goals can benefit from the application of the bioeconomy, has found four related areas:

1. The bioeconomy influences the achievement of the [end of poverty](#), [zero hunger](#) and the [reduction of inequalities](#).
2. The bioeconomy relates to the goals of [clean water and sanitation](#), [sustainable cities and communities](#) and [responsible consumption and production](#).
3. The bioeconomy drives [sustainable industry and infrastructure](#), as well as promoting [economic growth and decent work](#).
4. The bioeconomy promotes [health and well-being](#) and [climate action](#), which benefits [underwater life](#) and the [life of terrestrial ecosystem life](#).

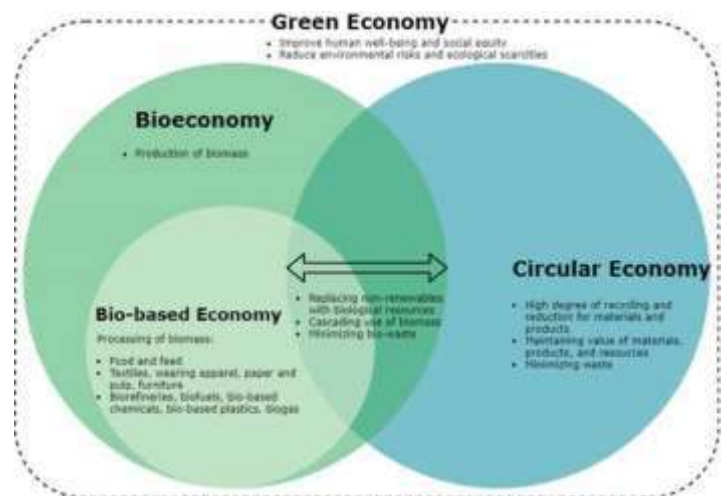




### The advantages of the Bioeconomy

The bioeconomy provides solutions to the main challenges facing humanity today, almost all of which are linked to climate change:

- Ensure [food security](#) and reduce hydro c stress.
- Sustainable management of natural resources to avoid overexploitation.
- Reduce dependence on fossil fuels and promote renewable energies.
- Develop actions aimed at [mitigating and adapting to climate change](#).
- Create [green jobs](#) and maintain productivity and competitiveness.
- Reduce GHG emissions and improve public health.



*A flourishing bioeconomy offers multiple benefits. It reduces dependence on fossil resources (which are limited and pollutant), uses local raw materials, thus curbing greenhouse gas emissions, promotes job creation, economic growth and re-industrialisation.*



**BIO-PROCESSING**  
In the bioeconomy, bioprocesses are developed and used to take advantage of these biomass or co-products and give them a new value.



Bioproducts developed from these biomass or co-products have applications in industrial sectors that can be completely different.



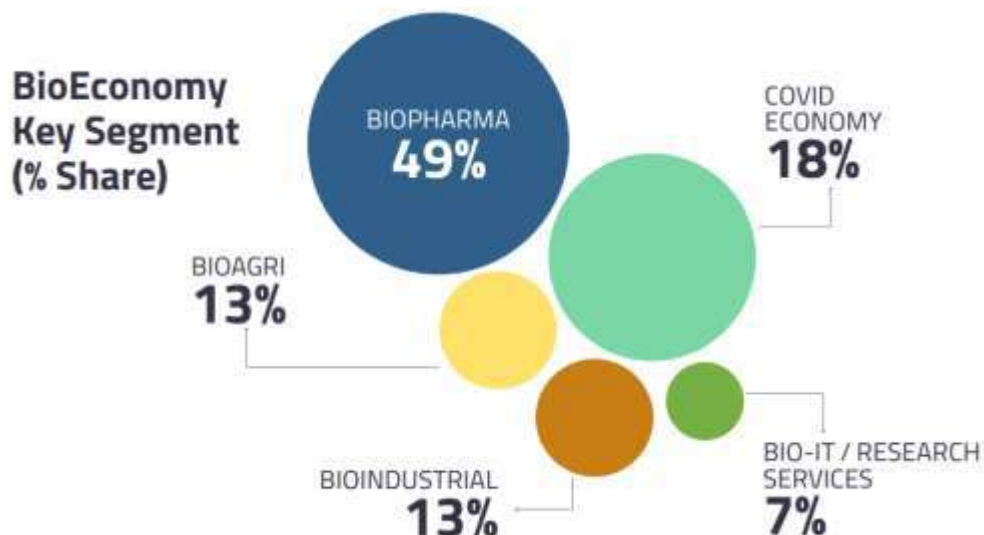
Industrial processes usually do not take advantage of certain biomasses or by-products that are traditionally considered waste.



In this way, these bioproducts are used again, closing a cycle of circular bioeconomy, in which biological resources extend their working lives for as long as is feasibly possible.

### Indian Bio-Economy

The Indian BioEconomy for 2021 (January-December 2021) is estimated at \$80.12 billion. The BioEconomy registered 14% growth over 2020. Indian BioEconomy is continued to nearly account for 2.6 percent share of India's GDP in 2021. India's BioEconomy continued to perform well during the pandemic years as the BioPharma segment responded to the vaccine and testing needs in India.



The nation has set an ambitious target for the BioEconomy to touch the \$150 billion threshold by 2025. Essentially, the performance of almost all the sectors that contribute to the national BioEconomy has to nearly double in the next 3-4 years to achieve this target.

### **INDIA SHOULD AIM FOR \$ 300 BILLION BIOECONOMY BY 2030**

India made biosimilars are getting accepted in developed markets like the USA and we can expect more nations to source cost effective biosimilars in many disease categories as these global quality medical products demonstrate their efficacy and popularity in foreign countries.

The Indian Diagnostics and medical devices market is likely to see a huge jump both in terms of consumption and exports. Covid-19 helped the nation to create the right ecosystem to manufacture, source, and export as well. The Diagnostics Labs services are also reaching across the breadth and width of country. “RTPCR tests” done here is a frequently spotted signs even in small cities and towns across the country, indicating the spread of this expertise Ayushman Bharat is aiding the spread and India’s BioEconomy from Diagnostics services and medical devices products is expected to touch \$35 billion by 2025.

Vaccines are expected to generate \$15 billion by 2025 and biotherapeutics another \$15 billion by 2025. The therapeutics segment is likely to create a BioEconomy of \$15 billion from recombinant and biosimilar products.

BioIndustrial is another important sector that has got fillip from the Prime Ministers vision of Atmanirbhar Bharat and India becoming “energy independent” by 2047. The Indian Government has approved the amendments to the National Policy on Biofuels and took decisions to increase biofuel production and advance the introduction of ethanol blended petrol with up to 20% blend from April 2023. The amendments include allowing more feedstocks for the production of biofuels permission for the export of biofuels in specific cases, support developments of indigenous technologies and generate more employment. The Biofuels capacity in the Indian is expected to grow from 5.2 billion liters in 2021 to 10.1 billion liters in 2025 (almost doubling). In terms of the economic value the Biofuel will generate \$20 billion BioEconomy by 2025 from \$6 billion in 2021 (almost tripling).

BioAgri comprising of Bt Cotton, pesticides, marine biotech, and animal biotech has the potential to nearly double its BioEconomy contribution from \$10.5 billion to \$20 billion in 2025. The impetus on circular economy will give the needed push to the sector.

BioServices sector comprising of CROs/ CDMOs and BioIT segment is forecast to grow from \$6.4 billion to \$26.6 billion. The segment will nearly quadruple. Most of the large IT companies have dedicated biotech / health care practice. Nearly 5-6 percent of the total value of company's income comes from the biotech portion of healthcare and life sciences practice.

New segments like smart proteins, protein and peptide-based materials, contact lens, speech restorers, smart pills, nerve regenerators, portable dialysis, prosthetic limbs, new wave of smart tediagnosics, will create a nearly \$10 billion in BioEconomy.

Just take the case of “ **alternate foods**” or “**smart proteins** “ India is the preferred destination for both Innovation and manufacture in the ‘Smart Protein area. There is a very big demand for fermentation capacities in this area from startups in US. We have already seen some of the investment happening and in the next 3-5 years there is a potential for 10 million litre fermentation capacities to be set up in India. This will attract an investment of more than \$ 500 million which will generate a revenue of \$1 billion every year. These facilities could be located in strategic places which has all the infrastructure for setting these big fermentation faculties. The industry just needs the support from a regulatory and infrastructure point of view to capitalise on this great emerging opportunity.

***Thus, India's BioEconomy has the potential to reach \$270-300 Billion by the year 2030 and account for nearly 3.3-3.5 % share of India's GDP from the 2.8 percent share in 2021.***

### **Transforming India into a Bio-economy**

- The use of multiple feed-stock to produce a diverse range of bio-products has created a golden opportunity to revive the Indian economy, as India stands as one of the leading producers of biomass energy. Around 18 GW of energy produced in India comes from biomass.
- This is an opportunity to reconcile with our environment and secure a sustainable and profitable future for the Indian economy. A simple change in the mind-set will foster an evergreen future across all industries and domains. To implement this effectively, it needs to be done at a fundamental level. So, ushering a bio-economy in India means working closely with India's existing environmental protection initiatives and developmental programs launched by the Government.
- The idea of Bio-economy needs to have a deep-rooted foundation in the political environment as well. The idea needs to flourish at the policy-making level.



Here are some steps that can be taken to aid the development of biotech in India

1. **Forming policies for biofuel**- Expediting project realization for 2G, CBC and Biodiesel.
2. **Supporting rural development**- Creating job opportunities, alternate revenue streams from farming.
3. **Presenting innovative ideas** or solutions to bring bio-products in the market.
4. Working towards building more **affordable technologies for mass adoption**.

*Bio-industry is all set to boom in the coming years. The solution to our environmental crisis is right in front of us, and corporations have a huge opportunity to make name for themselves in the “Bio era”.*

### Wrapping it up

The number of biotech Startups in the country has increased from 50 to over 5,300 in the last 10 years, because of the growing enabling ecosystem. Bioeconomy will be key to India's future economy over the next 25 years.

## Animal Welfare Board of India

### Context

- Animal Welfare Board of India has issued advisories with regard to stray dogs and pet dogs.

### About

- The **Animal Welfare Board of India (AWBI)**, headquartered at [Ballabhgarh](#) in [Haryana](#) state, is a statutory advisory body advising the [Government of India's Ministry of Fisheries, Animal Husbandry and Dairying](#) (Department of Animal Husbandry and Dairying). The AWBI headquarters were previously situated in [Chennai](#).
- The Animal Welfare Board of India was established in 1962 under Section 4 of [The Prevention of Cruelty to Animals Act, 1960](#).
- Well-known humanitarian [Rukmini Devi Arundale](#) was instrumental in setting up the board and was its first chair.
- The Board consists of 28 Members, who serve for a period of 3 years. Its headquarters were in Chennai, and moved to Ballabhgarh in [Faridabad district](#) of Haryana in early 2018.

- The board was initially within the jurisdiction of the Government of India's Ministry of Food and Agriculture. In 1990, the subject of Prevention of Cruelty to Animals was transferred to the Ministry of Environment, Forests and Climate change, where it now resides.

<https://newsonair.gov.in/News?title=Animal-Welfare-Board-of-India-issues-advisories-with-regard-to-stray-dogs-and-pet-dogs&id=451970>

## Longewala Battle

### Context

- To mark the 51st anniversary of **India's victory in the Longewala battle during the 1971 war**, Parakram Diwas will be celebrated at Jaisalmer Military Station and Longewala War Memorial in Rajasthan.

### Battle of Longewala

- The **Battle of Longewala** (4–7 December 1971) was one of the first major [engagements](#) in the western sector during the [Indo-Pakistani War of 1971](#), fought between assaulting [Pakistani](#) forces and [Indian](#) defenders at the Indian border post of [Longewala](#), in the [Thar Desert](#) of [Rajasthan](#) state in India.
- The battle was fought between 120 Indian soldiers accompanied by four [Hunter fighter aircraft](#) and 2,000–3,000 Pakistani soldiers accompanied by 30–40 tanks.
- The Longewala battle between India and Pakistan in 1971 was one of the biggest and most decisive battles, which is registered in the Golden words in History.

## National Anti-Doping Agency of India (NADA)

### Context

- The National Anti-Doping Agency of India (NADA) is developing Apps to assist athletes to verify medicines with prohibited substances.

### About

- The National Anti-Doping Agency of India is India's national organisation responsible for promoting, coordinating, and monitoring the doping control program in sports in all its forms.

- The agency deals with adopting and implementing anti-doping rules and policies which conform with the World Anti-Doping Agency, cooperates with other anti-doping organisations and promotes anti-doping research and education.
- The agency is formed by the Union Government under the **Societies Registration Act** and includes scientists and representatives from the Indian Olympic Association.

## WADA

- The **World Anti-Doping Agency** is a foundation initiated by the [International Olympic Committee](#) based in [Canada](#) to promote, coordinate, and monitor the fight against drugs in sports.
- The agency's key activities include scientific research, education, development of anti-doping capacities, and monitoring of the World Anti-Doping Code, whose provisions are enforced by the [UNESCO International Convention Against Doping in Sport](#). The aims of the [Council of Europe](#) Anti-Doping Convention and the [United States Anti-Doping Agency](#) are also closely aligned with those of WADA.

<https://newsonair.gov.in/News?title=NADA-to-develop-Apps-to-assist-athletes-verify-medicines-with-prohibited-substances&id=451739>

## PARIS CLUB

### Context

- Paris Club creditor nations are proposing a 10-year moratorium on Sri Lankan debt and another 15 years of debt restructuring as a formula to resolve the Sri Lankan debt crisis.
- The Paris club has called upon the Global north and south to take a haircut in restructuring of Sri Lankan debt. So far no official proposal has been made by Paris club to China or India.
- **Note:** Earlier this year, Sri Lanka had defaulted on its 51-billion-dollar external debt in the midst of spiralling political and economic crisis. India has provided emergency aid to the tune of four billion dollars to the Island nation to tide over its economic crisis this year.

### About

- The Paris Club is a group of officials from 22 major creditor countries whose role is to find co-ordinated and sustainable solutions to the payment difficulties experienced by debtor countries. As debtor countries undertake

reforms to stabilize and restore their macroeconomic and financial situation, Paris Club creditors provide an appropriate debt treatment.

- Paris Club creditors provide debt treatments to debtor countries in the form of rescheduling, which is debt relief by postponement or, in the case of concessional rescheduling, reduction in debt service obligations during a defined period (flow treatment) or as of a set date (stock treatment).
- The Paris Club was created gradually from 1956, when the first negotiation between Argentina and its public creditors took place in Paris. The Paris Club treats public claims (that is to say, those due by governments of debtor countries and by the private sector), guaranteed by the public sector to Paris Club members.
- Creditor countries meet ten times a year in Paris for *Tour d'Horizon* and negotiating sessions. To facilitate Paris Club operations, the French Treasury provides a small secretariat, and a senior official of the French Treasury is appointed chairman.
- Since 1956, the Paris Club has signed 433 agreements with 90 countries covering over US\$583 billion.

<https://newsonair.gov.in/News?title=Paris-Club-proposes-10-year-moratorium-on-Sri-Lankan-debt&id=451812>