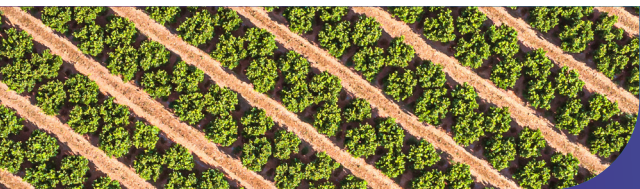


The Circular Bioeconomy

Unlocking Regenerative Solutions for a Sustainable Future

The circular bioeconomy is an economic model that combines the principles of sustainability, resource efficiency, and renewable biological resource use. It seeks to maximize the value derived from natural materials by keeping them in use for as long as possible, minimizing waste, and reducing environmental impacts.

This approach leverages both renewable biological resources, such as biomass, and bioprocesses that recycle existing fossil resources, preventing their conversion into pollution like carbon and methane emissions. By closing resource loops and promoting sustainable production, the circular bioeconomy fosters economic growth, while enhancing environmental protection and social resilience.



In a circular bioeconomy, biomass plays a significant role in continuous production and contributes to the overall improvement of the economy.

Unlocking Sustainability: *The Role of the Circular Bioeconomy in Shaping a Greener Tomorrow*

The circular bioeconomy bridges the gap between achieving climate goals and fostering economic development by utilizing renewable biological resources as alternatives to traditionally fossil-based materials. It represents a vital shift from a linear, consumption-based model to a regenerative system that addresses global challenges, including:

- Waste Reduction
- Resource Scarcity
- Emissions Mitigation
- Biodiversity Loss



By extracting value from waste streams, the circular bioeconomy integrates nature-based solutions and systems approaches to improve productivity and sustainability. These principles are deeply rooted in agricultural practices, demonstrating how agriculture and biotechnology serve as cornerstones of this economic model.

Collaborative Action

Farmers, producers, and developers are key players in the circular bioeconomy. Their relationships form a circular network, where every action has ripple effects across farms, communities, value chains, and the ecosystems they depend on.

Advancements in the Bioeconomy: *Transforming Agriculture and Industry with Bioinnovations*

A shift to a climate-resilient economy relies on replacing fossil fuels with renewable energy and moving toward fossil-free materials. BIO's Agriculture and Environment members are at the forefront of this transformation, driving innovations that advance the bioeconomy, with a few examples including:

- **Maas Energy Works:** Partnering with farmers to incorporate [dairy digester](#) technology into their systems, reducing methane emissions from agricultural waste on dairy farms.
- **Pivot Bio:** Developing [nitrogen-fixing microbes](#) to naturally provide crops with nitrogen, reducing reliance on synthetic fertilizers.
- **LanzaTech:** Converting carbon emissions, including agricultural waste, into valuable products like ethanol and chemicals through [microbial fermentation](#).



The circular bioeconomy speaks to all of the bioeconomy.

While the circular bioeconomy needs advanced technology, innovation, and traditional knowledge to succeed, it ultimately relies on biodiversity as its true engine.

BIOTECHNOLOGY BY THE NUMBERS

- **2.1 MILLION** direct employees across 127,000+ businesses
- **11% GROWTH** in employment since 2018, compared to 1.5% reduction in jobs economywide
- **\$2.9 TRILLION** USD in economic output impacts