



## Synthetic Biology

**For Prelims:** Synthetic Biology, Applications of Synthetic Biology

**For Mains:** Biotechnology, Scientific Innovations & Discoveries

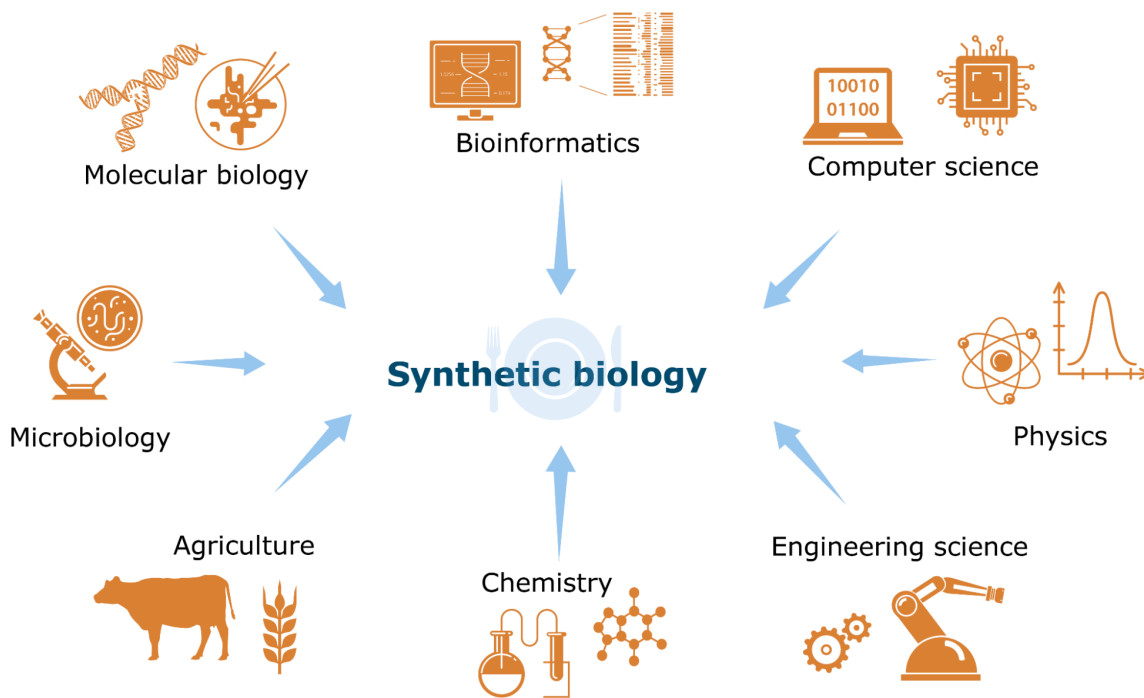
### Why in News?

As per study by USA, due to [climate change](#) **one-third of all animal and plant species on the planet could face extinction by 2070.**

- Environmentalists consider **synthetic biology or 'synbio'** as a potential tool to preserve biodiversity and restore the natural ecosystem.

### What is Synthetic Biology?

- The term 'synthetic biology' was **first used by Barbara Hobomin in 1980**, to describe bacteria that had been genetically engineered using recombinant DNA technology.
- Synthetic biology **refers to the science of using genetic sequencing, editing, and modification to create unnatural organisms or organic molecules** that can function in living systems.
- Synthetic biology enables scientists to design and synthesise new sequences of DNA from scratch.
- The term was used to describe the synthesis of unnatural organic molecules that function in living systems.
- More broadly in this sense, the term has been used with reference to efforts to 'redesign life'.



## What is the use of Synthetic Biology in Preserving Biodiversity and Ecosystem?

- This technology could be helpful in **use for sustainable production of bioenergy, drugs, and food.**
- Interesting application of synbio are its usage for the **capture of [carbon dioxide](#) from industrial emissions.**
  - Further, the captured gas is then **recycled to fuels using microorganisms.** Potentially, such transformations comprise benefits ranging from protecting threatened species to providing synthetic alternatives to wildlife products.
- This technology would help us resolve some of society's most imperative problems from infectious disease to drug development to sustainability.
- Its helping scientists find the right answers, faster and in a more efficient way and driving them towards the path of innovation.

## What are the Concerns related to Synthetic Biology?

- **Economic concerns:**
  - It can create a surge in the economy causing a shift towards biotechnology-based economies.
  - This will affect the rural economy and low-income tropical countries.
  - Natural products are usually grown and harvested in low-income countries, this could be displaced by advancements in synthetic biology
- **Environmental concerns:**
  - When a new species is created or when a species is intensely modified, the activity of species and their coexistence with other organisms is unpredictable.

## Way Forward

- To be able to reach the **UN Sustainable Development Goals**, there is a need to walk extra miles beyond reducing emissions.
- The need of the hour is to reinstate ecological balance and cut down pollution and plastic waste from our industrial processes and day-to-day activities.
- It's just a part of the solution to the most severe threats to the environment including reducing chemical and plastic pollution, and cling carbon dioxide from the environment, but we as an individual also need to fulfil our responsibility toward the environment.

