DAILY CURRENT AFFAIRS 05-06-2024

GS-1

1. **Stromatolites**
2. **Samoa Island**

GS-3

3. **GDP**
4. **Recombinant proteins**
5. **Kendu Leaves**

Stromatolites

Syllabus: GS-1; Geography- Evolution; GS-3; Environment and Ecology

Context

- *Scientists have identified living stromatolites on* **Saudi Arabia's Sheybarah Island** *in the* **Red Sea**, *marking the first discovery of living shallow-marine stromatolites in the Middle East.*
- *The discovery raises significant questions related to how and where life first originated on planet Earth.*

About

- *Stromatolites or stromatoliths, are* **layered sedimentary formations (microbialite) that are created mainly by photosynthetic microorganisms such as cyanobacteria, sulfate-reducing bacteria, and Pseudomonadota (formerly proteobacteria).**
- *These microorganisms produce adhesive compounds that cement sand and other rocky materials to form mineral "***microbial mats***".*
- *In turn, these mats build up layer by layer, growing gradually over time.*
- *This process generates the characteristic lamination of stromatolites, a feature that is hard to interpret, in terms of its temporal and environmental significance.*

- *A stromatolite may grow to a meter or more.*
- *Fossilized stromatolites provide important records of some of the most ancient life.*
- *As of the Holocene, living forms are rare.*
- *Stromatolites are layered, biochemical, accretionary structures formed in shallow water by the trapping, binding and cementation of sedimentary grains in* **biofilms** *(specifically microbial mats), through the action of certain microbial lifeforms, especially cyanobacteria.*
- *They exhibit a variety of forms and structures, or morphologies, including conical, stratiform, domal, columnar, and branching types.*
- *Stromatolites occur widely in the fossil record of the Precambrian but are rare today.*
- *Very few Archean stromatolites contain fossilized microbes, but fossilized microbes are sometimes abundant in Proterozoic stromatolites.*

Significance

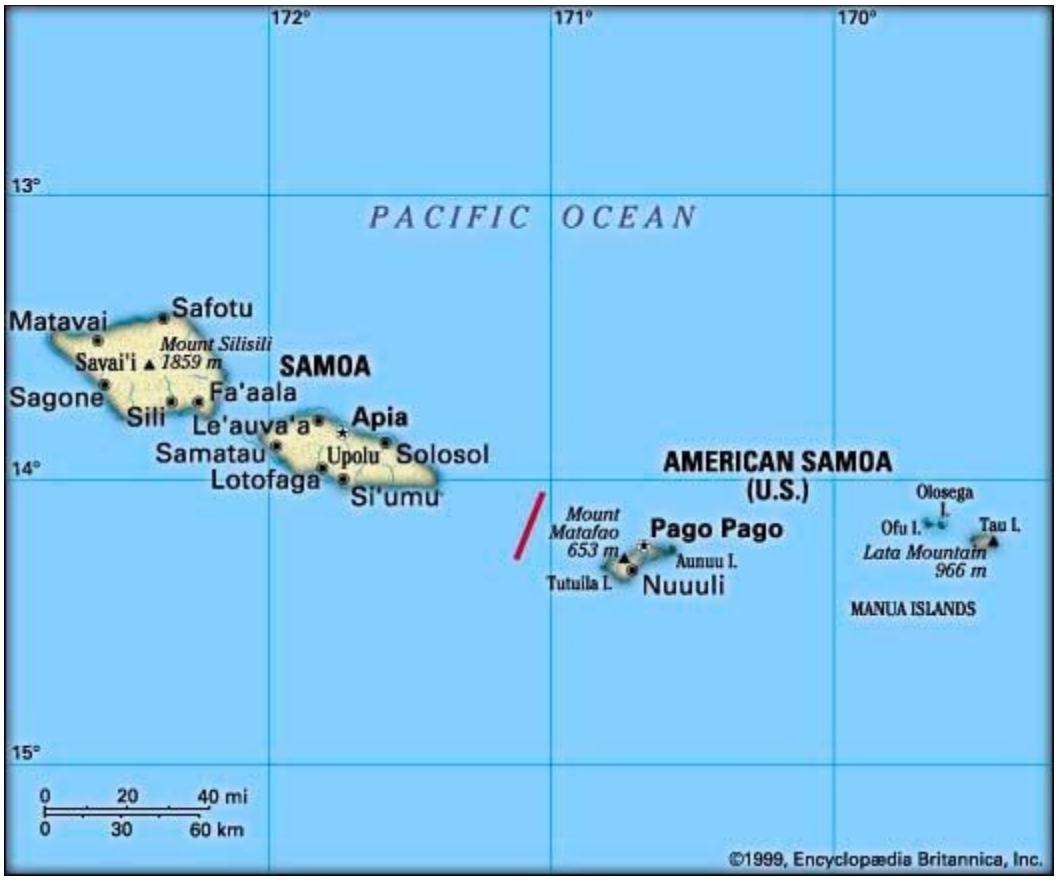
- *The reason this is such a crucial discovery is because Stromatolites are the* **earliest geological indicators of life on Earth.**
- *Further, these biotic structures were instrumental in the* **Great Oxygenation Event** *over two billion years ago, introducing oxygen into the atmosphere and transforming the planet's habitability.*

Samoa Island

Syllabus: GS-1; Geography-Mapping

Context

- *Samoa island joins 4th Small Island Developing States Conference and Gender Equality Forum.*



About

- *The Samoan Islands are an archipelago covering 3,030 km2 (1,170 sq mi) in the central* **South Pacific**, *forming part of* **Polynesia** *and of the wider region of Oceania.*
- *Administratively, the archipelago comprises all of the* **Independent State of Samoa** *and most of* **American Samoa** *(apart from Swains Island, which is geographically part of the Tokelau Islands).*
- *The land masses of the two Samoan jurisdictions are separated by 64 km (40 mi) of ocean at their closest points.*
- *Samoans are one of the largest Polynesian populations in the world.*
- *The larger islands are volcanic in origin, mountainous, and covered in tropical moist forest. Some of the smaller islands are coral atolls with black sand beaches.*
- *The highest point in Samoa is* **Mt. Silisili**, *on the island of Savai'i. At 1,858 m (6,096 ft), it is also one of the highest peaks in Polynesia.*
- *The volcanic Samoa island chain may have been formed by the activity of the Samoa hotspot at the eastern end of the Samoa Islands.*

GDP

Syllabus: GS-3; Economy

Context

- *The growth of the Indian economy by a robust 8.2% in the just-concluded financial year (2023-24), as seen from the provisional estimates released by the* **National Statistical Office (NSO),** *is much more than earlier projections and expectations.*

About

- *Gross domestic product (GDP) is the* **total monetary or market value of all the finished goods and services produced within a country's borders in a specific time period.**
- *GDP provides an* **economic snapshot of a country**, *used to estimate the size of an economy and its growth rate.*
- *GDP can be calculated in three ways, using expenditures, production, or incomes and it can be adjusted for inflation and population to provide deeper insights.*
- *Real GDP takes into account the effects of inflation while nominal GDP does not.*
- *Though it has limitations, GDP is a* **key tool to guide policymakers, investors, and businesses in strategic decision-making.**

Types

- **Nominal GDP** *is the value of all goods and services produced at current market prices. This includes inflation and deflation.*
- **Real GDP** *is the value of all goods and services at a base price value, which means the GDP is inflation-adjusted.*

GDP per capita

- *GDP per capita is a metric used to calculate a country's average standard of living or degree of wealth among its citizens.*
- *It is computed by taking the GDP of a country and dividing it by the entire population*

PPP GDP

- *GDP by purchasing power parity, or PPP GDP, is a metric that makes it possible to estimate a territory's GDP by removing price discrepancies between countries.*
- *Because it reflects the purchasing power of the populace, adjusting the GDP by purchasing power parity yields a more accurate assessment of the state of the economy and of people's well-being.*
- *This makes cross-national comparisons more fair and realistic.*

How is gross domestic product (GDP) calculated?

1. Expenditure Method

It represents the total amount of money locals spend overtime on finished goods and services. Therefore,

GDP = C + I + G + X – M

- *C: Consumption*
- *I: Investment*
- *G: Public spending*
- *X: Exports*
- *M: Imports*

2. Value Added Method

It is the total amount of added value (gross) produced within a specific period in a country during the production of products and services. The gross domestic product formula is:

GDP = GVA + taxes – subsidies

GVA is Gross value added)

3. Income Method

It is equal to the total amount of money made during a given period by the proprietors of the productive factors (labour and capital).

GDP = RA + EBE + taxes – subsidies

RA: Remuneration of employees, or the total of all the salaries that residents of a region earn.

EBE: Gross operating surplus.

Recombinant proteins

Syllabus: GS-3: Science and Technology – Biotechnology.

Context:

- *IISc researchers develop novel method for mass production of recombinant proteins.*

More about innovation:

- *Researchers at the* **Department of Biochemistry**, *Indian Institute of Science, created a new method for producing recombinant proteins.*

- **Traditional production uses yeast cell factories** *and methanol, which is risky and can create harmful byproducts.*
- *The new method uses a safer compound,* **monosodium glutamate (MSG***), a common food additive.*
- **Recombinant proteins***, such as* **vaccine antigens, insulin, and monoclonal antibodies***, are typically made by growing modified cells in large bioreactors.*
- *The most common organism used for this production is the* **yeast Pichia pastoris (Komagataellaphaffii).**

Traditional methodology:

- *The method involves a unique promoter, a specific gene region activated by methanol.*
- *This promoter codes for an* **enzyme called alcohol oxidase** *(AOX).*
- *To produce recombinant protein, the gene for the protein is* **placed next to the AOX promoter in the yeast genome.**
- *Yeast cells are* **initially fed glycerol** *or glucose as a carbon source.*
- *Once enough cells have grown,* **methanol is added to activate the AOX promoter***, causing the cells to produce large amounts of the recombinant protein.*
- *Most industries use this methanol-induced process, but methanol is flammable and hazardous.*
- *Methanol can also* **produce hydrogen peroxide***, which may stress yeast cells or damage the proteins.*

New methodology:

- *The study discussing these findings was published in Microbial Cell Factories and co-authored by Prof. P.N. Rangarajan.*
- *The team discovered that* **monosodium glutamate** *(MSG), a safe food additive, can activate a different promoter in the yeast genome.*
- *This promoter is for an enzyme called* **phosphoenolpyruvate carboxykinase** *(PEPCK).*
- *Activating the* **PEPCK promoter with MSG results in protein production** *similar to that achieved with methanol and the AOX promoter.*
- *The new MSG-based system could be used in biotech industries* **to mass-produce valuable proteins** *for products like milk and egg proteins, baby food supplements, nutraceuticals, and therapeutic molecules.*

Kendu Leaves

Syllabus: GS-3; Forest Resouce

Context

- *Odisha tribals await forest department nod to sell kendu leaf worth Rs 34 lakh.*

About

- **Diospyros melanoxylon, the Coromandel ebony or East Indian ebony**, *is a species of flowering tree in the family Ebenaceae native to India and Sri Lanka; it has a hard, dry bark.*
- *Its common name derives from Coromandel, the coast of southeastern India. Locally it is known as temburini or by its Hindi name* **tendu.**
- *In Odisha, Jharkhand, and Assam, it is known as* **kendu**.
- *In Andhra Pradesh, and Telangana it is known as* **tuniki**.
- *The leaves can be wrapped around tobacco to create the* **Indian beedi**, *which has* **outsold conventional cigarettes** *in India.*
- *The olive-green fruit of the tree is edible.*

Uses

- *The leaf of the tree contains valuable flavones.*

- *The pentacyclic triterpenes found in the leaves possess* **antimicrobial properties**, *while the bark shows antihyperglycemic activity.*
- *The bark of four Diospyros species found in India has been determined to have significant* **antiplasmodial effects against Plasmodium falciparum**, *which causes malaria in humans.*
- *Tendu leaves are used as a wrapper for beedi.*

Method of collection

- *During the summer, fresh leaves are produced by the suckers that emerge from the soil.*
- *This is also enhanced by lighting a fire beneath the Tendu tree.*
- *The fresh leaves are hand-picked by the tribals and dried in the sun for 10 days.*
- *This practice is seen in Maharashtra, Madhya Pradesh, Odisha and Chhattisgarh states of India.*
- *The State Government gives the license for collection and processing of the tendu leaves through tender every year.*