



## India's Unique Job Crisis

**For Prelims:** National Statistical Office, Periodic Labour Survey, Employment in different Sectors, Types of Unemployment

**For Mains:** Significance of Agriculture Sector in Economy, Employment & Unemployment in India, Types of Unemployment

### Why in News?

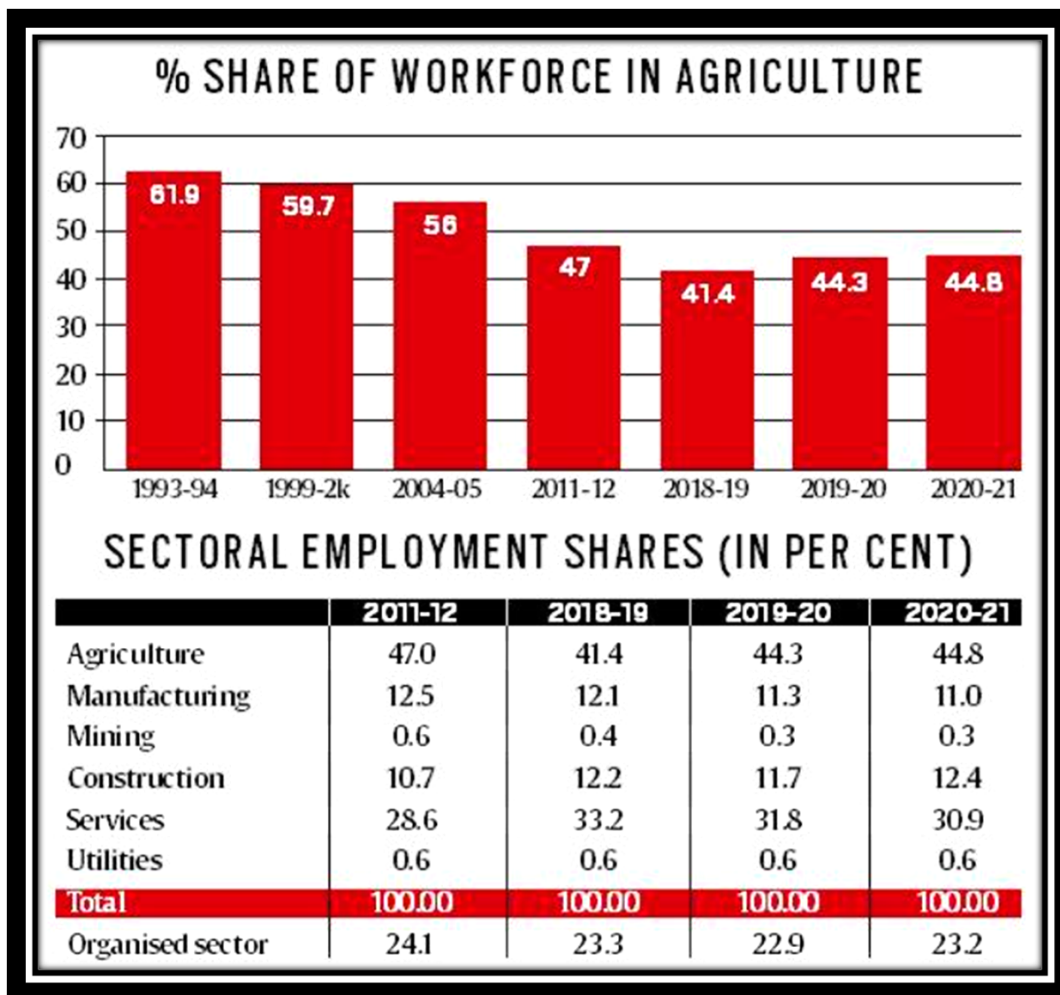
As per a recent study, there are **fewer people employed in agriculture today**, but the transformation has been weak.

- Those moving out of farms are **working more in construction sites and the informal economy than in factories.**

### How much Employment does the Agriculture Sector provide?

- In 1993-94, agriculture accounted for close to **62% of the country's employed labour force.**
- The labour percentage in agriculture (based on data from the [National Statistical Office's Periodic Labour Force Surveys](#)), dropped almost 6% points by 2004-05 and 9% points over the next seven years.
  - The declining trend continued, albeit at a slower pace, in the subsequent seven as well.
- Between 1993-94 and 2018-19, agriculture's share in India's workforce **came down from 61.9% to 41.4%.**
  - It is estimated that given its level of **per capita GDP** in 2018, India's farm sector **should be employing 33-34% of the total workforce.**
    - 41.4% may not be a substantial deviation from the average.

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## How has India's Employment Trends been?

### ▪ Agriculture:

#### ◦ Reversal of Trend:

- There's been a **reversal of the trend** in the last two years, which has seen the share of those employed in farms **rise to 44-45% in 2020-21**.
  - This has primarily to do with the **Covid-induced economic disruptions**.

#### ◦ Structural Transformation:

- Even the movement of workforce from agriculture that India has witnessed over the past three decades or more **does not qualify as what economists call "structural transformation"**.
  - **Structural transformation** would involve the **transfer of labour from farming to sectors** - particularly **manufacturing and modern services** - where productivity, value-addition and average incomes are higher.
  - However, the share of manufacturing (and mining) in total employment **has actually fallen along with that of agriculture**.
  - The surplus labour pulled out from the **farms is being largely absorbed in construction and services**.
- The **structural transformation process in India has been weak** and deficient.
  - There is movement of labour taking place away from farms - even if stalled, possibly temporarily.
  - But that surplus labour **isn't moving to higher value-added non-farm activities**, specifically manufacturing and modern services.
  - The labour transfer is happening within the low-productivity informal economy.

### ▪ Service Sector:

- The services sector **does include relatively well-paying industries** such as

[information technology](#), business process outsourcing, telecommunications, finance, [healthcare](#), [education](#) and **public administration**.

- The bulk of the jobs in this case are in **petty retailing, small eateries, domestic help, sanitation, security staffing, transport** and similar other informal economic activities.
- This is also evident from the low share of employment in [organised enterprises](#), defined as those engaging 10 or more workers.

## How is the Information Technology Sector Emerging as a Job Provider?

- Between 2020-22, the **combined employee headcount** at India's top five IT companies (Tata Consultancy Services, Infosys, Wipro, HCL Technologies and Tech Mahindra) has gone **up from 11.55 lakh to 15.69 lakh**.
  - That's a jump of **4.14 lakh or nearly 36% in the period post the pandemic**, when most other sectors, barring agriculture, **were shedding jobs and slashing salaries**.
  - These five companies, put together, have more employees than the [Indian Railways](#) and the **three defense services, respectively**.
- Much of the IT sector's recent success is courtesy of [exports](#).
  - These have boomed due to **Covid's triggering increased demand for digitisation** even among businesses that were hitherto slow in adoption:
    - **India's net exports of software services** have surged from \$84.64 billion in 2019-20 to \$109.54 billion in 2021-22.

## What could be done to Curb Unemployment?

- **Skills of Agriculture Labours:**
  - Schemes for **upskilling the workforce involved in the agriculture** sector should be prioritized by the government.
    - It would provide the **dual benefit** of enhancing the knowledge for efficient farming and also, in case the labour wants to switch careers, they can look for other superior areas of employment.
- **Promoting Labour Intensive Industries:**
  - There are a number of **labour-intensive manufacturing sectors in India** such as [food processing](#), leather and footwear, wood manufacturers and furniture, textiles and apparel and garments.
    - **Special packages**, individually designed for each industry are needed to create jobs.
- **Decentralisation of Industries:**
  - **Decentralisation of Industrial activities** is necessary so that people of every region get employment.
  - [Development of the rural areas](#) will help mitigate the migration of the rural people to the urban areas thus decreasing the pressure on the urban area jobs.
- **Government's Initiatives:**
  - [Support for Marginalized Individuals for Livelihood and Enterprise \(SMILE\)](#)
  - [PM-DAKSH \(Pradhan Mantri Dakshta Aur Kushalta Sampann Hitgrahi\)](#)
  - [Mahatma Gandhi National Rural Employment Guarantee Act \(MGNREGA\)](#)
  - [Pradhan Mantri Kaushal Vikas Yojana \(PMKVY\)](#)
  - [Start Up India Scheme](#)

## What are different types of Unemployment?

- **Disguised Unemployment:**
  - It is a phenomenon wherein **more people are employed than actually needed**.
  - It is primarily traced in the **agricultural and the unorganised sectors of India**.
- **Seasonal Unemployment:**
  - It is an unemployment that occurs during **certain seasons of the year**.
  - **Agricultural labourers** in India rarely have work throughout the year.
- **Structural Unemployment:**

- It is a category of unemployment arising from the **mismatch between the jobs available in the market and the skills of the available workers in the market.**
- **Cyclical Unemployment:**
  - It is a result of the **business cycle, where unemployment rises during [recessions](#) and declines with [economic growth](#).**
- **Technological Unemployment:**
  - It is the loss of jobs due to **changes in technology.**
- **Frictional Unemployment:**
  - The Frictional Unemployment also called as **Search Unemployment**, refers to the time lag between the jobs when an individual is searching for a new job or is switching between the jobs.
- **Vulnerable Employment:**
  - This means, **people working informally**, without proper job contracts and thus sans any legal protection.
  - These persons are deemed 'unemployed' since records of their work are never maintained.

## UPSC Civil Services Examination, Previous Year Questions (PYQs)

### Prelims

#### **Q. Disguised unemployment generally means (2013)**

- (a) large number of people remain unemployed
- (b) alternative employment is not available
- (c) marginal productivity of labour is zero
- (d) productivity of workers is low

**Ans: (c)**

#### **Explanation**

- An economy demonstrates a low level of output that is gained by addition of one unit of labour. Disguised unemployment when productivity is low and too many workers are filling too few jobs.
- Marginal productivity refers to the additional output that is gained by addition of one unit of labour.
- Since, in disguised unemployment, more number of labour than required are already engaged in the work, the marginal productivity of labour is zero.
- **Therefore, option (c) is the correct answer.**

### Mains

**Q. Can the strategy of regional-resource based manufacturing help in promoting employment in India? (2019)**

**Q. Normally countries shift from agriculture to industry and then later to services, but India shifted directly from agriculture to services. What are the reasons for the huge growth of services vis-a-vis industry in the country? Can India become a developed country without a strong industrial base? (2014)**

**Source: IE**

# Food Processing Sector

**For Prelims:** Food Processing Sector, Priority Sector Lending (PSL), Food Safety and Standards Authority of India (FSSAI), Mega Food Parks (MFP), Designated Food Parks (DFPs).

**For Mains:** Significance of Food Processing sector in India.

## Why in News?

Recently, in a written reply to the [Rajya Sabha](#) Minister of State (Food Processing Industries) stated the initiatives taken by the Government to support the [Food Processing Sector](#).

## What is Food Processing and the Present Status of the Sector in India?

- **About:**
  - Food processing is a **type of manufacturing in which raw materials are processed into intermediate foods or edible items** using scientific knowledge and technology.
    - Bulky, perishable, and occasionally inedible food resources are converted into more usable, concentrated, shelf-stable, and pleasant meals or beverages using a variety of techniques.
      - It **improves the storability, portability, palatability, and convenience of the finished product.**
- **Significance:**
  - The Indian food sector **ranks fifth in terms of scale, contributing almost 6% of GDP, 13% of Indian exports, and 6% of overall industrial investment in the country.**
- **Present Status:**
  - India is the **world's second-largest producer of fruits and vegetables, after China, yet just 2% of the crop gets processed.**
  - Despite a significant manufacturing base, the **processing is little (less than 10 percent).**
    - Processing accounts for around 2% of fruits and vegetables, 8% of marine products, 35% of milk, and 6% of poultry.
  - India has **the world's greatest livestock population, with 50% of buffaloes and 20% of cattle**, but only around 1% of the entire meat population is transformed into value-added goods.

## What are the Various Policy Measures taken by the Government?

- Inclusion of **food & agro-based processing units and cold chain** as an agricultural activity under [Priority Sector Lending \(PSL\)](#) norms in April 2015.
- As a measure toward [ease of doing business](#), the [Food Safety and Standards Authority of India \(FSSAI\)](#) through notifications in 2016 has **shifted from product-by-product approval to an ingredient and additive-based approval process.**
- 100% [Foreign Direct Investment \(FDI\)](#) approval under automatic route has been permitted for the food processing sector
- A Special Food Processing Fund of Rs. 2000 crore was set up with [National Bank for Agriculture and Rural Development \(NABARD\)](#) to provide affordable **credit for investments** in setting up [Mega Food Parks \(MFP\)](#) as well as processing units in the MFPs.
  - In 2019, the coverage of the fund was extended to the setting up of **Agro-Processing Clusters** along with setting up of individual manufacturing units.
  - Also, a [Designated Food Parks \(DFPs\)](#) scheme would be introduced in different states for the purpose of availing affordable credit from the special funds with NABARD.

## Way Forward

- At present, India is processing less than 10% of its agricultural output; thus, presenting immense opportunities to boost processing levels and attract investments in this sector. so, the Government measures are in the right direction.
- Further, the growth of the food processing sector will be led by the demand in retail and the rise of health-conscious consumers.
  - Hence, there is a need for a strong crop value chain with adequate funding and technology applications that will boost the food processing sector via the [MSME](#) sector.

### UPSC Civil Services Examination Previous Year Question (PYQ)

#### Prelims

**Q. With what purpose is the Government of India promoting the concept of “Mega Food Parks”? (2011)**

1. To provide good infrastructure facilities for the food processing industry.
2. To increase the processing of perishable items and reduce wastage.
3. To provide emerging and eco-friendly food processing technologies to entrepreneurs.

**Select the correct answer using the codes given below:**

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

**Ans: (b)**

- The Scheme of “**Mega Food Park**” aims at providing a mechanism to link agricultural production to the market by bringing together farmers, processors and retailers, so as to ensure maximizing value addition, minimizing wastage, increasing farmers’ income and creating employment opportunities, particularly in the rural sector. **Hence, 2 is correct.**

#### Mians

**Q. What are the reasons for the poor acceptance of a cost-effective small processing unit? How the food processing unit will be helpful to uplift the socioeconomic status of poor farmers? (2017)**

**Source: PIB**

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## Outbound Travel and Tourism - An Opportunity Untapped

**For Prelims:** Tourism in India, Schemes Related to tourism.

**For Mains:** Significance and Challenges related to Tourism in India.

## Why in News?

Recently a report was released titled 'Outbound Travel and Tourism - An Opportunity Untapped', which shows India's outbound tourism will surpass USD 42 billion by 2024.

- Outbound tourism is the **act of travelling 'out' of the home country** for the purposes of tourism.

## What are the Findings of the Report?

- The Indian outbound travel market is **among the fastest growing markets globally with approximately 80 million passport levels of purchasing power**, especially among the middle class.
- With a growing economy, young population, and growing middle class, **India is ideally positioned to become one of the most lucrative outbound tourism markets** in the world.
- Europe sees 20% of the travellers from India's outbound traffic. 10 % travel to Australia and New Zealand, while the rest of the traffic is towards Southeast Asia.
- **In 2021, Indians spent approximately USD 12.6 billion in outbound trips**, compared to USD 22.9 billion in 2019. While the reason for decrease in spending could be due to the pandemic, these figures point out the huge value that can be captured from Indian outbound travellers.

## What are the Recommendations?

- Government can look at steps like **increasing direct connections to popular and upcoming destinations**, allowing foreign cruise vessels to operate on Indian waters, besides taking concerted and **coordinated efforts on multiple fronts** to propel the outbound tourism market.
- **Allowing foreign cruise vessels to include Indian destinations** as a stop would encourage **both inbound and outbound tourism** as well as increase revenue for Indian ports.
- With the positive response of foreign delegations and their policies, India can establish **bilateral relations with tourist-friendly countries** for both inbound and outbound tourists.

## What is the Scenario of Tourism in India?

- **About:**
  - India attracted a lot of travellers in the past due to its fabled wealth. Visit of [Hieun-tsang](#), **a devout Chinese Buddhist is an example of this.**
  - Pilgrim Travel got a boost when **Emperors like Ashoka and Harsha started building rest houses** for pilgrims.
  - Arthashastra' pointing out the **importance of the travel infrastructure for the state, which played an important role** in the past.
  - Post-Independence, Tourism continuously remained part of the [Five Year Plans \(FYP\)](#).
    - Different forms of Tourism like Business Tourism, Health Tourism, and Wildlife Tourism etc. were introduced in India after seventh FYP.
- **Status:**
  - India's Tourism is ranked at 10<sup>th</sup> position in terms of its contribution to World [GDP \(Gross Domestic Product\)](#) in the World Travel and Tourism Council's report in 2019.
    - During 2019, contribution of travel & tourism to GDP was 6.8% of the total economy, Rs. 13,68,100 crore (USD 194.30 billion).
  - India as of now in 2021 has 40 sites listed under '[World Heritage List](#)', **6<sup>th</sup> highest (32 cultural, 7 natural and 1 mixed site) in the world.**
    - [Dholavira](#) and [Ramappa Temple \(Telangana\)](#) are the latest ones.
  - In FY20, the tourism sector in India accounted for 39 million jobs, which was 8.0 % of the total employment in the country. By 2029, it is expected to account for about 53 million jobs.
- **Significance:**
  - **Service Sector:**
    - It gives a push to the service sector. A large number of businesses engaged in the service sector such as airlines, hotel, surface transportation, etc. grows with the



growth of the tourism industry.

- **Foreign Exchange:**
  - Foreign Travellers help India in getting [Foreign Exchange](#).
  - The foreign exchange earnings from 2016 to 2019 grew at a CAGR of 7% but dipped in 2020 due to the [Covid-19 pandemic](#).
- **Preservation of National Heritage:**
  - Tourism helps in preservation of National Heritage and Environment by bringing in focus the importance of sites and the need to preserve them.
- **Renewal of Cultural Pride:**
  - Tourist spots being appreciated globally instils a sense of pride among Indian residents.
- **Infrastructural Development:**
  - Now-a-days, it is ensured that Travelers do not face any problem; multiple use infrastructures are getting developed at several tourist places.
- **Recognition:**
  - It helps in bringing India on the global map of tourism, earning appreciation, recognition and initiates cultural exchange.
- **Promotes Cultural Diplomacy:**
  - Tourism as a form of soft power, helps in promoting cultural diplomacy, people to people connect and thereby promotes friendship and cooperation between India and other countries.
- **Challenges:**
  - **Lacking in Infrastructure:**
    - Tourists in India still face many infrastructure related problems like inadequate roads, water, sewer, hotels and telecommunications etc.
  - **Safety and Security:**
    - Safety and security of tourists, especially of the foreign tourists, is a major hurdle to tourism development. Attacks on foreign nationals raise questions about India's ability to welcome tourists from far away countries.
  - **Lack of Skilled Manpower:**
    - Lack of skilled manpower is another challenge to the Tourism Industry in India.
  - **Absence of basic Amenities:**
    - Absence of basic amenities like drinking water, well maintained toilets, first aid, cafeteria etc. at tourist places.
  - **Seasonality:**
    - Seasonality in Tourism, with the busy season being limited to six months from October to March and heavy rush in November and December.

## What are the Initiatives Related to Tourism?

- [Swadesh Darshan Scheme](#)
- [National Mission on Pilgrimage Rejuvenation and Spiritual, Heritage Augmentation Drive](#)
- [Iconic Tourist Sites](#)
- [Buddhist Conclave](#)
- [Dekho Apna Desh Initiative](#)

[Source: BS](#)



**For Prelims:** CSIR, National Mission for Electric Mobility, Research and Development, Shanti Swaroop Bhatnagar

**For Mains:** Initiatives taken by CSIR, Government Policies & Interventions

## Why in News?

Senior electrochemical scientist Nallathamby Kalaiselvi has become the **first woman director general** of the **Council of Scientific and Industrial Research**.

- Kalaiselvi's research work of more than 25 years is primarily focused on electrochemical power systems and in particular, development of electrode materials, and electrochemical evaluation of in-house prepared electrode materials for their suitability in energy storage device assembly.
- Kalaiselvi also made key contributions to the [National Mission for Electric Mobility](#). She has more than 125 research papers and six patents to her credit.

## What is CSIR?

- **About:**
  - Council of Scientific and Industrial Research (CSIR) is the **largest research and development (R&D) organisation in India**.
  - CSIR has a pan-India presence and has a dynamic network of **37 national laboratories, 39 outreach centres, 3 Innovation Complexes and 5 units**.
  - CSIR is funded by the Ministry of Science and Technology and it operates as an autonomous body through the Societies Registration Act, 1860.
- **Scope:**
  - CSIR **covers a wide spectrum of streams** – from radio and space physics, oceanography, geophysics, chemicals, drugs, genomics, biotechnology and nanotechnology to mining, aeronautics, instrumentation, environmental engineering and information technology.
    - It provides **significant technological intervention in many areas with regard to societal efforts which include the environment**, health, drinking water, food, housing, energy, farm and non-farm sectors.
- **Established:** September 1942
- **Headquarters:** New Delhi

## What is the Structure of the Organisation?

- **President:** Prime Minister of India (Ex-officio)
- **Vice President:** Union Minister of Science and Technology (Ex-officio)
- **Governing Body:** The Director-General is the head of the governing body.
  - The other ex-officio member is the finance secretary (expenditures).
  - Other members' terms are of three years.

## What are the Objectives?

- The objectives of the Council are **scientific and industrial/applied research** of national importance.
- The activities include:
  - **Promotion, guidance and coordination of scientific and industrial research** in India including the institution and the financing of specific researchers.
  - **Establishment and assistance to special institutions** or departments of existing institutions for the scientific study of problems affecting particular industries and trade.
  - Establishment and award of **research studentships and fellowships**.
  - Utilization of the results of the research conducted under the auspices of the Council

towards the development of industries in the country.

- Payment of a share of **royalties arising out of the development of the results of research** to those who are considered as having contributed towards the pursuit of such research.
- Establishment, maintenance and **management of laboratories, workshops, institutes and organisations** to further scientific and industrial research.
- Collection and dissemination of information in regard not only to research but to industrial matters generally.
- Publication of scientific papers and a journal of industrial research and development.

## What is the Vision & Strategy 2022?

- **Vision:** Pursue science which strives for global impact, the technology that enables innovation-driven industry and nurtures trans-disciplinary leadership thereby catalyzing inclusive economic development for the people of India.

## What are Awards Associated with the Organisation?

- **Shanti Swarup Bhatnagar (SSB) Prize** for Science and Technology is named after the founder Director of the CSIR, the late Dr Shanti Swarup Bhatnagar.
- It was instituted in 1957 as the most coveted and revered prize in the field of science and technology in the country.

## Who was Dr Shanti Swarup Bhatnagar?

- He was the **Founder Director (and later first Director-General) of CSIR** who is credited with establishing twelve national laboratories.
- He played **a significant role in the building of post-independent Science and Technology infrastructure** and in the formulation of India's S & T policies. He concurrently held a number of important positions in the Government.
  - He was the **first Chairman of the University Grants Commission (UGC)**.
- He was conferred with **Order of British Empire (OBE)**. He was Knighted in 1941 and elected Fellow of the Royal Society, London in 1943.
- He was awarded the Padma Vibhushan in 1954 by the President of India.

## What are the Initiatives taken by CSIR?

- **Covid-19:**
  - CSIR has set up five technology verticals for addressing the emerging situation due to **pandemic**:
    - Digital and Molecular Surveillance.
    - Rapid and Economical Diagnostics.
    - Repurposing of Drugs, Vaccine and Convalescent Plasma Therapy.
    - Hospital Assistive Devices and PPEs (Personal Protective Equipment).
    - Supply Chain and Logistics Support Systems.
- **Strategic:**
  - Head-Up-Display (HUD): It developed indigenous Head-Up- display (HUD) for Indian Light Combat Aircraft, **Tejas**. HUD aids the pilot in flying the aircraft and in critical flight maneuvers including weapon aiming.
- **Energy & Environment:**
  - **Solar Tree:** It occupies minimum space to produce clean power.
  - **Lithium Ion Battery:** India's first **lithium ion battery** fabrication facility based on indigenous novel materials for making 4.0 V/14 h standard cells has been established.
- **Agriculture:**
  - **Samba Mahsuri Rice Variety:** It developed a Bacterial Blight Resistant Rice.

- **Rice Cultivar (Muktashree):** A rice variety has been developed which restricts assimilation of Arsenic within permissible limits.
- **White-fly resistant Cotton variety:** Developed a transgenic cotton line which is resistant to whiteflies.
- **Healthcare:**
  - **Genomics and other omics technologies for Enabling Medical Decision - GOMED:** It has been developed by the CSIR which provides a platform of disease genomics to solve clinical problems.
- **Food & Nutrition:**
  - **Ksheer-scanner:** It detects the level of milk adulteration and adulterants in 45 seconds at the cost of 10 paise.
  - **Double-Fortified Salt:** Salt fortified with iodine and iron having improved properties developed and tested for addressing anaemia in people.

[Source: TH](#)

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## Iran Nuclear Deal Talks

**For Prelims:** Joint Comprehensive Plan of Action, Countering America's Adversaries Through Sanctions Act (CAATSA), International Atomic Energy Agency (IAEA)

**For Mains:** Joint Comprehensive Plan of Action and its significance for reviving India's relation with Iran

### Why in News?

Recently, there has been a fresh round of talks over **Iran's nuclear programme** in Vienna to revive the 2015 nuclear deal which is also known as the [Joint Comprehensive Plan of Action \(JCPOA\)](#).

- Officials from various countries including Iran were meeting for the first time since March 2022.

# Changes agreed under Iran deal to limit nuclear programme



## What is the Iran Nuclear Deal?

### ▪ About:

- The Joint Comprehensive Plan of Action aims to guarantee the civilian nature of Iran's nuclear programme in **exchange for a gradual lifting of sanctions**.
- Iran signed the agreement with the **five permanent members of the U.N. Security Council — the U.S., Russia, France, China, and the United Kingdom — as well as Germany and the European Union**.
- Under the deal, **Iran agreed to significantly cut its stores of centrifuges, enriched uranium and heavy-water**, all key components for nuclear weapons.
- Iran also agreed to implement a protocol that it would **allow inspectors from the [International Atomic Energy Agency \(IAEA\)](#)** to access its nuclear sites to ensure Iran would not be able to develop nuclear weapons in secret.

### ▪ Issues:

- Due to the unilateral withdrawal of the United States in 2018 under former president Donald Trump and the re-imposition of U.S. sanctions, Iran has backtracked on its obligations.
- Iran subsequently exceeded the JCPOA's uranium enrichment rate of 3.67%, rising to 20% in early 2021.
  - It then crossed an unprecedented 60% threshold, getting closer to the 90 percent needed to make a bomb.
- **Opposing countries:**
  - **Israel**, America's closest ally in the Middle East, strongly rejected the deal, and

other countries like Iran's great regional rival **Saudi Arabia**, complained that they were not involved in the negotiations even though Iran's nuclear programme **posed security risks for every country in the region**.

## What is the significance of JCPOA for India?

- **Enhance regional connectivity:**
  - Removing sanctions may revive **India's interest in the [Chabahar port](#)**, Bandar Abbas port, and other plans for regional connectivity.
  - This would **further help India to neutralize the Chinese presence in Gwadar port**, Pakistan.
  - Apart from Chabahar, **India's interest in the [International North-South Transit Corridor \(INSTC\)](#)**, which runs through Iran, and will improve connectivity with five Central Asian republics, may also get a boost.
- **Energy Security:**
  - Due to the pressure linked to the **US [Countering America's Adversaries Through Sanctions Act \(CAATSA\)](#)**, **India has to bring down oil imports to zero**.
  - Restoration of ties between the US and Iran will **help India to procure cheap Iranian oil and aid in energy security**.

## Way Forward

- The US would have to factor in not only Iran's nuclear programme but also its increasingly hostile behavior in the region. It would also have to take into consideration the reality of the **new multipolar world, in which its unilateral leadership is no longer guaranteed**.
- Iran would have to consider **the rapidly changing dynamics in the Middle East**, given that Israel has recalibrated its relations with several Middle Eastern Arab countries in recent years.

## UPSC Civil Services Examination Previous Year Question (PYQ)

**Q. Which of the following is not a member of 'Gulf Cooperation Council'? (2016)**

- (a) Iran
- (b) Saudi Arabia
- (c) Oman
- (d) Kuwait

**Ans: (a)**

**Exp:**

- The Gulf Cooperation Council (GCC) is an alliance of 6 countries in the Arabian Peninsula – Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates. Iran is not a member of the GCC.
- It was established in 1981 to promote economic, security, cultural and social cooperation between the members and holds a summit every year to discuss cooperation and regional affairs.  
**Therefore, option (a) is the correct answer.**

**Source: TH**

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# Fungus for Pyrene Remediation

## Why in News?

Researchers at the [Council of Scientific & Industrial Research \(CSIR\)](#) have identified a fungus capable of removing toxic, recalcitrant (Not easily controlled), and carcinogenic Pyrene or **Polycyclic Aromatic Hydrocarbons (PAHs)** from the environment.

- The researchers used **gas chromatographic-mass spectrometer and serotome analysis** for their study.
- Gas chromatographic-mass spectrometric identification of prominent metabolites helped determine the pyrene degradation pathway and **Serotome analysis** in pyrene degradation helped **understand the degradation mechanism of pyrene.**



## What is Pyrene?

- **Pyrene**, possessing four benzene rings, **belongs to the highly toxic class of PAHs, with carcinogenic and mutagenic properties.**
- It gets **lodged into the environmental matrices** like soil, water and atmosphere, resulting in widespread environmental pollution, necessitating adequate remediation of contaminated environmental matrices.
- The rapid pace of economic development and industrialisation has resulted in the release of several PAHs into the environment.
- **PAHs are a class of chemicals** that occur naturally in coal, crude oil, and gasoline. These are **ubiquitous environmental pollutants** originating from multiple sources, including combustion of petrogenic fossil fuels, and incomplete incineration of municipal wastes and biomass.

## What are the Findings?

- Identified a **white-rot fungus Trametesmaxima IPLC-32**, which has the potential to cause microbial degradation of pyrene.
- Growing on dead plants, this fungus **causes pyrene degradation using special enzymes.**
  - The pyrene concentration decreased by 79.8%, 65.37% and 56.37% within 16 days from the initial levels of 10 mg per litre, 25 mg per litre and 50 mg per litre, respectively.
- This fungus **acts to decrease the pollution level** of the soil.

## What are the Implications?

- The fungus can cause **microbial degradation, thereby improving the soil quality.**
- The fungus *T.maxima* may prove to be **helpful in the remediation of especially pyrene.**

## What are the Recommendations?

- To combat pollution cause by the rapid pace of economic development and industrialisation, **resources are already present in the environment, which must be appropriately tapped** by us.
- *T.maxima* IIPLC-32 can be tried in the future for the **bioremediation of PAH-contaminated aquatic environments.**

## What is Bioremediation?

- **Bioremediation** is a branch of biotechnology that employs the use of living organisms, like microbes and bacteria to decontaminate affected areas.
- It is used in the **removal of contaminants**, pollutants, and toxins from soil, water, and other environments.
- Bioremediation is **used to clean up oil spills or contaminated groundwater.**
- Bioremediation may be done "**in situ**"-at the site of the contamination-or "**ex situ**"-away from the site.

## UPSC Civil Services Examination, Previous Year Questions (PYQs)

### Q. Consider the following organisms: (2013)

1. Agaricus
2. Nostoc
3. Spirogyra

### Which of the above is/are used as biofertilizer/biofertilizers?

- (a) 1 and 2  
(b) 2 only  
(c) 2 and 3  
(d) 3 only

### Ans: (b)

- Biofertilizers are products containing carrier based (solid or liquid) living microorganisms which are agriculturally useful in terms of nitrogen fixation, phosphorus solubilisation or nutrient mobilization to increase the productivity of soil or crop.
- Classification of biofertilizers based on microorganism:
  - Bacterial Biofertilizers: Rhizobium, Azospirillum, Azotobacter, Phosphobacteria, Nostoc, etc. Hence, 2 is correct.
  - **Fungal Biofertilizers: Mycorrhiza**
  - Algal Biofertilizers: Blue Green Algae (BGA) and Azolla.
  - Actinomycetes Biofertilizer: Frankia.
- **Agaricus is an edible fungus and is commonly known as mushroom.** It is a saprophytic fungus found growing on soil humus, decaying litter on forest floors, in the fields, lawns, wood logs and manure piles. Hence, 1 is not correct.
- Spirogyra is a large genus of freshwater green algae found in shallow ponds, ditches and amongst vegetation at the edges of large lakes, generally growing free-floating. It is valued for human consumption, and is known as an important source of natural bio-active compounds for antibiotic, antiviral, antioxidant, anti-inflammatory, and cytotoxic purposes. Hence, 3 is not correct.
- **Therefore, option (b) is the correct answer.**



**Q. Lichens, which are capable of initiating ecological succession even on a bare rock, are actually a symbiotic association of (2014)**

- (a) algae and bacteria
- (b) algae and fungi
- (c) bacteria and fungi
- (d) fungi and mosses

**Ans: (b)**

- Lichen is not a single organism. Rather, it is a **symbiosis between** different organisms - **a fungus and an alga or cyanobacterium**. Cyanobacteria are sometimes referred to as 'blue-green algae', though they are quite distinct from the algae.
- Lichens are amongst the first organisms to colonize the barren surfaces (e.g., road cuttings, rock outcrops and volcanic ash) and prepare these areas for later plants by trapping moisture and windblown organic debris and then contributing to the organic deposits when they themselves die and decay.
- **Therefore, option (b) is the correct answer.**

[Source: DTE](#)

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## Recovery of Coral Reefs in Great Barrier Reef

**For Prelims:** Great Barrier Reef (GBR), Corals, Acropora corals, Coral bleaching.

**For Mains:** Significance of Coral Reefs in Marine Ecosystem.

### Why in News?

According to the **Australian Institute of Marine Science's (AIMS)** annual long-term monitoring report, Australia's northern and central [Great Barrier Reef \(GBR\)](#) has experienced high levels of coral reef cover over the past 36 years.

- The researchers also warned that the gains could be quickly reversed due to rising global temperatures.



## What are the Key highlights of Report?

- **Quick Recovery:**
  - It states that **reef systems are resilient and capable of recovering after disturbances** such as accumulated heat stress, **cyclones**, predatory attacks.
  - It shows record levels of **region-wide coral cover in the northern and central GBR since the first ever Australian Institute of Marine Science (AIMS) survey was done.**
    - Coral cover is measured by determining the increase in the cover of hard corals.
- **Growth in Central & Northern:**
  - The hard coral cover in northern Great Barrier Reef had reached 36% while that in the central region had reached 33%.
  - Meanwhile, coral cover levels declined in the southern region from 38% in 2021 to 34% in 2022.
- **Dominated by Acropora corals:**
  - The high level of recovery is fueled by the increase in the fast-growing **Acropora corals**, which are a dominant type in the Great Barrier Reef.
  - Incidentally, these fast-growing corals are also the most susceptible to environmental pressures such as rising temperatures, cyclones, pollution, crown-of-thorn starfish (COTs) attacks which prey on hard corals and so on.
- **Less Natural Calamities:**
  - Also, behind the recent recovery in parts of the reef, are the low levels of acute stressors in the past 12 months — no tropical cyclones, lesser heat stress in 2020 and 2022 as opposed to 2016 and 2017, and a decrease in COTs outbreaks.

## What are the Issues Highlighted by the Report?

- **Climate change:**
  - The biggest threat to the health of the reef is [climate change](#)-induced heat stress, resulting in coral bleaching.
  - Despite several global initiatives sea temperatures are predicted to increase by 1.5°C to 2°C by the time the century nears its end.
  - According to the United Nations assessment in 2021, the world is going to experience heating at 1.5°C in the next decade, **the temperature at which bleaching becomes more frequent and recovery less impactful.**
- **Frequent Mass bleaching:**
  - In recent times mass bleaching events have become more frequent.
  - **The first mass bleaching event occurred in 1998 when the El Niño weather pattern caused sea surfaces to heat, causing 8% of the world's coral to die.**
  - The second event took place in 2002. But the longest and most damaging bleaching event took place from 2014 to 2017.
  - The aerial surveys by AIMS included 47 reefs and coral bleaching was recorded on 45 of these reefs.
    - While the levels were not high enough to cause coral death it did leave sub-lethal effects such as reduced growth and reproduction.

## What are Coral Reefs?

- **About:**
  - [Corals](#) are marine invertebrates or animals which **do not possess a spine.**
  - They are the largest living structures on the planet.
  - **Each coral is called a polyp and thousands of such polyps live together to form a colony, which grow when polyps multiply to make copies of themselves.**
  - Further, they are of **two types:**
    - **Hard corals:**
      - They extract calcium carbonate from seawater to build hard, white coral exoskeletons.
      - They are in a way the **engineers of reef ecosystems** and measuring the extent of hard coral is a widely-accepted metric for measuring the condition of coral reefs.
    - **Soft corals:**
      - They attach themselves to such skeletons and older skeletons built by their ancestors.
      - Soft corals also add their own skeletons to the hard structure over the years.
        - These growing multiplying structures gradually form coral reefs.
- **Significance:**
  - They support over 25% of marine biodiversity even though they take up only 1% of the seafloor.
  - The marine life supported by reefs further fuels global fishing industries.
    - Besides, coral reef systems generate USD 2.7 trillion in annual economic value through goods and service trade and tourism.

## What is Australia's Great Barrier Reef?

- **About:**
  - It is the world's largest reef system stretching across 2,300 km and having nearly 3,000 individual reefs.
  - Further, it hosts 400 different types of coral, gives shelter to 1,500 species of fish and 4,000 types of mollusc.
- **Significance:**
  - In pre-[Covid-19](#) times, the Reef generated USD 4.6 billion annually through tourism and employed over 60,000 people including divers and guides.

## Way Forward

- With estimates that coral reefs are among the most threatened ecosystems on Earth, there is a dire need for societal-level changes to reduce human impacts on coral reef ecosystems is no longer a debate.
- The achievement of [Sustainable Development Goals](#) (SDG 14) by 2030 could help improve ocean resources, to be sure.
  - Actions that protect top predators, identify key herbivorous fish species for protection, halt destructive fishing, boating and diving, and manage exploitation of reef fish cannot hurt.
    - Nevertheless, much more **aggressive action and education from the top down to grassroots efforts to achieve a carbon-neutral planet are required to protect coral reefs.**

## UPSC Civil Services Examination Previous Year Question (PYQ)

### Prelims

**Q. Which of the following have coral reefs? (2014)**

1. Andaman and Nicobar Islands
2. Gulf of Kachchh
3. Gulf of Mannar
4. Sunderbans

**Select the correct answer using the code given below:**

- (a) 1, 2 and 3 only  
(b) 2 and 4 only  
(c) 1 and 3 only  
(d) 1, 2, 3 and 4

**Ans: (a)**

**Exp:**

- India with its coastline extending over 7,500 kilometres and subtropical climatic conditions has very few coral reef areas.
- **The major coral reef formations in India are,**
  - **Gulf of Mannar, hence, 3 is correct.**
  - **Palk Bay,**
  - **Gulf of Kuchchh, hence, 2 is correct.**
  - **Andaman and Nicobar Islands, hence, 1 is correct.**
  - **Lakshadweep Islands.**
- While the Lakshadweep reefs are atolls, all the others are fringing reefs. Patchy coral is present in the intertidal areas of the central west coast of the country.
- Coral reefs require clean and clear water, warm surface water and sunlight to survive. Since, most of these requirements are not met in Sunderbans region, coral reefs are not found here. Other disadvantage to reef growth are the heavy monsoonal rains and the high human presence on the coastline. Hence, 4 is not correct. **Therefore, option (a) is the correct answer.**

### Mains

**Q. Assess the impact of global warming on the coral life system with examples (2019)**

## New Bills in Lok Sabha

### Why in News?

Two new bills, the **Competition (Amendment) Bill, 2022** & **New Delhi International Arbitration Centre (Amendment) Bill** were introduced in the Lok Sabha.

### What is Competition (Amendment) Bill 2022?

- **About:**
  - It seeks to change the structure of the [Competition Commission of India \(CCI\)](#).
  - It seeks to introduce provisions to **allow the CCI to address the needs of new-age markets**.
  - It also has provisions for having **'value of transaction'** as a criteria for **notifying combinations to the CCI**.
- **Other Proposed Amendments:**
  - A limitation period of three years for **filing information on anti-competitive agreements and abuse of dominant position before the CCI**.
  - Changes in certain definitions like **'enterprise'**, **'relevant product market'**, **'group'** and **'control'** to provide clarity.
- **Features:**
  - Broadening **anti-competitive agreements**.
  - Faster approvals of **mergers and acquisitions (M&A)**.
  - **Reducing penalty** for parties willing to share information during an investigation.
  - Reducing litigation.

### What is the Competition Commission of India?

- **About:**
  - [Competition Commission of India \(CCI\)](#) is a **statutory body** of the Government of India responsible for enforcing the [Competition Act, 2002](#), it was duly constituted in March 2009.
  - [The Monopolies and Restrictive Trade Practices Act, 1969 \(MRTP Act\)](#) was repealed and replaced by the Competition Act, 2002, on the recommendations of the **Raghavan committee**.
- **Objective:**
  - Competition Commission of India (CCI) is the **competition regulator**, and an **antitrust watchdog for smaller organizations** that are unable to defend themselves against large corporations, with the larger aim of **consumer welfare**, ensuring **fair and healthy competition** in economic activities.
- **Composition:**
  - The Commission consists of **one Chairperson and six Members** who shall be **appointed by the Central Government**.
  - The commission is a **quasi-judicial body** which gives **opinions to statutory authorities** and also deals with other cases. The Chairperson and other Members shall be **whole-time Members**.

### What is the New Delhi International Arbitration Centre (Amendment) Bill?

- **The New Delhi International Arbitration Centre (NDIAC)** is an autonomous institution based in New Delhi, **to conduct arbitration, mediation, and conciliation proceedings**.

- It was established in 2019 and declared as an **Institute of National Importance** by an Act of Parliament.
  - **The New Delhi International Arbitration Centre (Amendment) Bill**, was introduced by the Law Minister to change its name to India **International Arbitration Centre**.

[Source: TH](#)

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## Tejas Jets for Delivery

### Why in News?

The Government of India has offered to sell **18 Light-Combat Aircraft (LCA) “Tejas”** to **Malaysia**.

- **Argentina, Australia, Egypt, the United States, Indonesia, and the Philippines** were also interested in the single-engine jet.
- The Indian government gave a **USD6 billion contract to state-owned Hindustan Aeronautics Limited** in 2021 for 83 of the locally produced Tejas jets for delivery starting around 2023.

### What is Tejas Aircraft?



- **About:**
  - **The Light Combat Aircraft (LCA)** programme was started by the Government of India in 1984 when they established the **Aeronautical Development Agency (ADA)** to manage the LCA programme.
  - It replaced the **ageing Mig 21 fighter planes**.
- **Designed by:**
  - Aeronautical Development Agency under the **Department of Defence Research and Development**.
- **Manufactured by:**
  - State-owned **Hindustan Aeronautics Limited (HAL)**.
- **Features:**
  - The **lightest, smallest and tailless** multi-role supersonic fighter aircraft in its class.
  - Designed to carry a range of **air-to-air, air-to-surface, precision-guided, weapons**.
  - Air to air refuelling capability.
  - Maximum payload capacity of 4000 kg.
  - It can attend the maximum speed of Mach 1.8.

- The range of the aircraft is 3,000km
- **Variants of Tejas:**
  - **Tejas Trainer:**
    - 2-seater operational conversion trainer for training air force pilots.
  - **LCA Navy:**
    - Twin- and single-seat carrier-capable for the Indian Navy.
  - **LCA Tejas Navy MK2:**
    - This is phase 2 of the LCA Navy variant.
  - **LCA Tejas Mk-1A:**
    - This is an improvement over the LCA Tejas Mk1 with a higher thrust engine.

**[Source: IE](#)**

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