Food Processing Sector in India

For Prelims: Food processing sector, Food Safety and Standards Authority of India, Foreign direct investment, National Bank for Agriculture and Rural Development , Pradhan Mantri Kisan Sampada Yojana , Pradhan Mantri Formalisation of Micro Food Processing Enterprises Scheme

For Mains: Status of the Food Processing Sector in India, Government Initiatives Related to Food Processing Sector.

Source: TH

Why in News?

At the **17th edition of ANUTEC - International FoodTec India**, held in Mumbai, prominent figures from the industry and government unveiled a promising future for the **food processing sector in India**. It is on a **remarkable trajectory of growth,** poised to become **one of the key drivers of the nation's economy.**

What is the Status of the Food Processing Sector in India?

- **About Food Processing:**
  - The **food processing sector is a crucial component of the overall food supply chain.**
    - It involves the **transformation of raw agricultural and livestock products into processed and value-added food products** that are suitable for consumption.
  - This sector encompasses a wide range of **activities, technologies, and processes** aimed at making food products **safer, more convenient, and longer-lasting,** while also enhancing their flavor and nutritional value.
- **Food Processing Sector in India:**
  - The Food processing sector significantly contributes to India’s economy, accounting for **13% of** exports **and 6% of industrial investment.**
    - The sector has attracted substantial **foreign direct investments (FDI)**, with **USD 4.18 billion** pouring in from **2014 to 2020,** indicating **confidence in its future prospects.**
  - It is **expected to generate a whopping 9 million jobs by 2024.** Also, by 2030, India is set to become the **world's fifth-largest consumer of food and** food technology**,** as household consumption quadruples.
    - This underlines the **sector's immense growth potential.**
- **Government Initiatives Related to Food Processing Sector:**
  - Inclusion of **food & agro-based processing units** and cold chain as an agricultural activity under **Priority Sector Lending (PSL)** norms in April 2015.
  - Shifting from **product-by-product approval to an ingredient and additive-based approval process** by the **Food Safety and Standards Authority of India (FSSAI)** through notifications in **2016 as a measure toward ease of doing business.**
  - Allowing **100% Foreign Direct Investment (FDI)** approval under automatic route for the

food processing sector.
    - Setting up a Special Food Processing Fund of Rs. 2000 crore with **National Bank for Agriculture and Rural Development (NABARD).**
    - **Other Government Initiatives:**
        - **Pradhan Mantri Kisan Sampada Yojana**
        - **Pradhan Mantri Formalisation of Micro Food Processing Enterprises Scheme**
        - Production Linked Incentive (PLI) Scheme **for food processing industry**
- **Challenges Related to Food Processing Sector:**
    - **Lack of Cold Chain and Storage: Inadequate cold storage and transportation** facilities result in significant post-harvest losses of perishable goods. This not only **affects food quality but also impacts the income of farmers.**
    - **Fragmented Supply Chain:** The supply chain in India is **highly fragmented, leading to inefficiencies and increased costs.** Poor road and rail infrastructure can result in delays and losses during transportation.
    - **Complex Regulations:** The food processing industry is subject to a **complex web of regulations, licenses, and permits,** which can be challenging for businesses to navigate.
        - **Inconsistent enforcement of regulations** can lead to unfair competition and quality issues.
    - **Food Safety Concerns:** Ensuring food safety and quality standards across the supply chain remains a significant challenge. **Contaminated or adulterated food products can harm public health** and damage the reputation of the sector.
    - **Research and Development**: Limited investment in research and development inhibits innovation and the development of new, value-added products.
        - India's **research and development (R&D) expenditure-GDP ratio** of 0.7% is very low when compared to major economies and is **much below the world average of 1.8%.**

Way Forward

- **Smart Food Processing Hubs:** Establishing **smart food processing hubs** equipped with advanced technologies like **Internet of Things (IoT)**, **artificial intelligence (AI)**, and **blockchain**. These hubs can **monitor the entire food supply chain, from farm to table, ensuring quality, traceability, and efficiency.**
- **Nutraceutical Innovation:** Developing a range of **functional and nutraceutical foods tailored to specific health needs.** These could include **foods fortified with essential nutrients, probiotics, and bioactive compounds** to address prevalent health concerns in the Indian population.
- **Zero-Waste Processing:** Implementing **zero-waste processing techniques where every part of the raw material is utilized.** For instance, **converting food waste into biofuels** or using food byproducts to create new products like bio-plastics or animal feed.
- **Community-Based Processing Centers:** Establishing community-based food processing centers in rural areas. These centers can serve as **hubs for local farmers to process their produce**, reducing post-harvest losses and creating rural employment opportunities.

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)

Mains

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

Lab Grown Human Embryo Model

For Prelims: Human Embryo, **In Vitro fertilization**, Stem Cells

For Mains: Ethical considerations surrounding embryo research, Importance of research and study of embryo models.

Source: IE

Why in News?

Recently, Scientists have achieved a remarkable feat by creating a **lab-grown "human embryo" model** using **stem cells and chemicals, without using an egg or sperm** shedding light on **early embryo development.**

How Was the Embryo Model Created?

- Researchers from Israel utilized a combination of **stem cells and chemicals to create a model of a 14-day-old human embryo.**
    - This mix of stem cells and chemicals was a **crucial starting point for creating an embryo-like structure.**
- The Israeli researchers' model was able to spontaneously assemble into different types of cells that **form the fetus,** provide nutrients to the fetus, lay out the **plan for body development, and create structures like the placenta and umbilical cord to support the fetus.**
- A challenge faced was that only **1% of the mixture came together on its own, showing a need for better efficiency.**

What Have These Models Revealed About Early Development?

- Models help uncover errors in Deoxyribonucleic acid(DNA) **duplication and chromosome distribution.**
    - Researchers found that DNA duplication abnormalities occur early in the process, affecting cell division.
- These models enable the study of gene **functions** and their roles in fetal development.

Why Are Embryo Models and Research Important?

- Studying early embryo development is ethically challenging once implantation in the uterus occurs.
- Research during these initial stages is vital as **most miscarriages and birth defects happen in this period.**
- Understanding normal embryo development and genetic factors can improve invitro fertilization **outcomes.**
- It helps researchers **grasp genetic, epigenetic, and environmental influences on embryonic development.**

Can Lab-Grown Embryos Be Used for Pregnancy?

- **No,** these models are intended **solely for studying early fetal development.**
- They are generally destroyed after 14 days, and implantation is not permitted.
    - The **14-day limit was proposed in 1979 in the UK, equivalent to when natural embryo implantation finishes.**
        - It marks the point when **cells begin forming an "individual," and breaking off into a twin is not possible.**
    - Ethical considerations change as embryos transition from cell clusters to individuals.
- The ethical considerations become different when it is a clump of cells and when it becomes an individual, often related to what is referred to as **the Primitive Streak.**
    - Primitive Streak is a **linear structure** that appears in the embryo that marks its **transition from having a radial symmetry (like an egg) to the bilateral symmetry of our bodies** (marked by left and right hands and legs).

Human Embryo:

- A human embryo is a **developing human being from the moment of fertilization until the end of the eighth week of gestation.**
- A human embryo has three main stages of development: **the pre-implantation stage, the implantation stage, and the organogenesis stage.**
- A human embryo is composed of different types of cells that differentiate into various tissues and organs.
- A human embryo is normally created by the fertilization of a **human egg (oocyte) by a human sperm in the female reproductive tract or in a laboratory.**

Stem Cell:

- A stem cell is a cell with the unique **ability to develop into specialized cell types in the body.**
    - In the future they may be **used to replace cells and tissues that have been damaged or lost due to disease.**
- They have two unique properties that enable them to do this:
    - They **can divide over and over again to produce new cells.**
    - As they divide, they **can change into the other types of cell that make up the body.**

Type of Stem Cell	Source	Potential of the Stem Cell
Embryonic Totipotent Stem Cells	These stem cells are found in the very early stages of a fertilized embryo, typically within the first few days after fertilization.	Can become any cell in the body even form the placenta(an organ in the uterus during pregnancy that provides oxygen and nutrients to the growing baby)
Embryonic Pluripotent Stem Cells	Derived from the inner cell mass of a slightly more developed embryo (around 4-5 days after fertilization).	Can become many different cell types in the body but cannot form the placenta.
Adult Multipotent Stem	Found in various tissues in	Multipotent stem cells are

Cells	the human body, like bone marrow or skin.	more specialized.They can only differentiate into a limited range of cell types specific to the tissue they are found in. For example, bone marrow stem cells can develop into different blood cell types, but not into skin cells.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q2. With reference to 'stem cells', frequently in the news, which of the following statements is/are correct? (2012)

1. Stem cells can be derived from mammals only
2. Stem cells can be used for screening new drugs
3. Stem cells can be used for medical therapies

Select the correct answer using the codes given below:

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

Ans: (b)

Exp:

- Stem cells are undifferentiated or "blank," cells capable of developing into cells that serve numerous functions in different parts of the body. Most cells in the body are differentiated cells. These cells can only serve a specific purpose in a particular organ. For example, red blood cells are specifically designed to carry oxygen through the blood.
- Stem cells are not only found in mammals, but also found in plants and other organisms. **Hence, statement 1 is not correct.**
- Since stem cells have the ability to turn into various other types of cells, scientists believe that they can be useful for treating and understanding diseases. According to the scientists, stem cells can be used to:
    - Grow new cells in a laboratory to replace damaged organs or tissues.
    - Correct parts of organs that do not work properly
    - Research causes of genetic defects in cells.
    - Research how diseases occur or why certain cells develop into cancer cells.
    - Test new drugs for safety and effectiveness. **Hence, statement 2 is correct.**
    - To carry out medical therapies. **Hence, statement 3 is correct.**
- **Therefore, option (b) is the correct answer.**

20th ASEAN-India Summit and the 18th East Asia Summit

For Prelims: ASEAN-India Summit, East Asia Summit, India's Digital Public Infrastructure

For Mains: Role of the EAS in addressing regional issues of common interest and concern, Significance of ASEAN for India, India-ASEAN Areas of Cooperation

Source: PIB

Why in News?

Recently, the **Prime Minister (PM) of India attended the 20th** Association of Southeast Asian Nations(ASEAN)-India Summit **and the 18th** East Asia Summit (EAS) **in Jakarta, Indonesia.**

- The two summits were an opportunity for **India to strengthen its relationships with ASEAN countries** and reaffirm its commitment to a free, open, and rules-based **Indo-Pacific.**

What are the Key Highlights of the 20th ASEAN-India Summit?

- The PM of India presented a **12-point proposal for strengthening India – ASEAN cooperation** covering connectivity, digital transformation, trade and economic engagement, addressing contemporary challenges, people-to-people contacts, and deepening strategic engagement.
- **The 12-point proposal included the following:**
  - Establishing **multi-modal connectivity and economic corridor that links South-East Asia-India-West Asia-Europe.**
  - Offered to share India's Digital Public Infrastructure **Stack with ASEAN partners.**
  - Announced an ASEAN-India fund for **Digital Future focusing on cooperation in digital transformation and financial connectivity.**
  - Announced renewal of support to the **Economic and Research Institute of ASEAN and East Asia (ERIA)** to act as a knowledge partner for enhancing our engagement.
  - Called for collectively raising issues being faced by Global South **in multilateral fora**
  - Invited ASEAN countries to join the Global Centre for Traditional Medicine being established by WHO **in India.**
  - Called for **working together on** Mission LiFE(Lifestyle for the Environment.
  - Offered to share India's experience in providing affordable and quality medicines to people through **Jan-Aushadhi Kendras.**
  - Called for a collective fight **against terrorism, terror financing, and cyber-disinformation.**
  - Invited **ASEAN countries to join the** Coalition for Disaster Resilient Infrastructure. Called for cooperation in disaster management.
  - Called for enhanced cooperation on **maritime safety, security, and domain awareness**.

Association of Southeast Asian Nations:

- **About:**
  - The ASEAN was established on 8 August 1967 in Bangkok, Thailand, with the signing of the **ASEAN Declaration (Bangkok Declaration) by the Founding Fathers of ASEAN: Indonesia, Malaysia, Philippines, Singapore and Thailand.**
  - The organization's goal is to **promote stability and economic growth across these nations.**
  - Its **chairmanship rotates annually, based on the alphabetical order of the English names of Member States.**
  - The region has **one of the largest economies in the world, and it is believed that by 2050, it will have the 4th-largest economy in the world.**

- **Members:**
  - ASEAN brings together ten Southeast Asian states – Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam – into one organization.

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What are the Key Highlights of the 18th East Asia Summit?

- **Reaffirming Commitment to East Asia Summit:**
  - The PM of India emphasized the significance of the EAS mechanism and reaffirmed **India's support for further strengthening it.**
  - India's strong support for ASEAN centrality and called for ensuring a free, **open and rules-based Indo-Pacific.**
- **Quad's Vision and Global Challenges:**
  - Insights into the PM's discussion on the **Quad's vision** and the cooperative approach to address global challenges like terrorism, climate change, and resilient supply chains.
- **India's Initiatives in Climate Change:**
  - India's initiatives in climate change, including ISA (International Solar Alliance)**, CDRI (Coalition for Disaster Resilient Infrastructure), LiFE (Mission LiFE), and** OSOWOG (One Sun One World One Grid) **was highlighted.**

East Asia Summit

- **About:**
  - The EAS was established in **2005 as an Association of Southeast Asian Nations (ASEAN)-led initiative.**
  - The EAS is the **only leader-led forum in the Indo-Pacific** that brings together all key partners to discuss political, security and economic issues of strategic importance.
  - The EAS operates on the principles of **openness, inclusiveness, respect for international law,** ASEAN centrality, and ASEAN's role as the driving force.

    - The idea of an East Asia Grouping was first proposed by then **Malaysian Prime Minister Mahathir Mohamad in 1991.**
        - The first summit was held in **Kuala Lumpur, Malaysia on 14 December 2005.**
- **Members:**
    - The EAS comprises **18 members**: the **10 ASEAN countries** (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam) and eight dialogue partners (Australia, China, India, Japan, New Zealand, Republic of Korea, Russia and the United States).
- **Six Priority Areas of Cooperation:**
    - Environment and energy, education, finance, global health issues and pandemic diseases, natural disaster management, and ASEAN Connectivity.
- **India and East Asia Summit:**
    - **India has been a founding member of the EAS since 2005** and has actively participated in all its meetings and activities.
    - India views the EAS as a key platform for enhancing its **Act East Policy** and strengthening its strategic partnership with ASEAN and other regional countries.
    - At the **East Asia Summit** in Bangkok in **November 2019**, India had unveiled India's **Indo-Pacific Oceans Initiative (IPOI),** which is aimed at forging partnerships to create a secure and stable maritime domain.
    - India has contributed to the EAS cooperation in various fields, such as disaster management, renewable energy, education, health, connectivity, maritime security and counterterrorism.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q1. India is a member of which among the following? (2015)

1. Asia-Pacific Economic Cooperation
2. Association of South-East Asian Nations
3. East Asia Summit

Select the correct answer using the code given below:

(a) 1 and 2 only
(b) 3 only
(c) 1, 2 and 3
(d) India is a member of none of them

Ans: (b)

Q2. Consider the following countries: (2018)

1. Australia
2. Canada
3. China
4. India
5. Japan
6. USA

Which of the above are among the 'free-trade partners' of ASEAN?

(a) 1, 2, 4 and 5
(b) 3, 4, 5 and 6

(c) 1, 3, 4 and 5
(d) 2, 3, 4 and 6

Ans: (c)

Q3. The term 'Regional Comprehensive Economic Partnership' often appears in the news in the context of the affairs of a group of countries known as (2016)

(a) G20
(b) ASEAN
(c) SCO
(d) SAARC

Ans: (b)

Exp:

- Regional Comprehensive Economic Partnership (RCEP) is a Free Trade Agreement (FTA) between the ten member states of the Association of Southeast Asian Nations (ASEAN) and the five countries (Australia, China, Japan, South Korea and New Zealand) with which ASEAN has existing FTAs.
- **Therefore, option (b) is the correct answer.**

Q4. In the Mekong-Ganga Cooperation, an initiative of six countries, which of the following is/are not a participant/ participants? (2015)

1. Bangladesh
2. Cambodia
3. China
4. Myanmar
5. Thailand

Select the correct answer using the code given below:

(a) 1 only
(b) 2, 3 and 4
(c) 1 and 3
(d) 1, 2 and 5

Ans: (c)

Mains

Q. Evaluate the economic and strategic dimensions of India's Look East Policy in the context of the post-Cold War international scenario. **(2016)**

Himachal Pradesh Seeks National Disaster Tag

For Prelims: National Disaster Tag, **Monsoon**, **National Disaster Management Authority (NDMA)**, Disaster Management Act 2005, National Calamity Contingency Fund (NCCF), Severe Calamity.

For Mains: Himachal Pradesh Seeks National Disaster Tag.

Source: IE

Why in News?

Recently, Himachal Pradesh has requested the Indian Prime Minister to declare the destruction caused by heavy rains in the state a National Disaster.

- Himachal Pradesh suffered losses of **Rs 10,000 crore and around 418 people have died due to rain-related incidents** this **Monsoon 2023.**
- In the event of a calamity of a severe nature, additional Central assistance is provided from the National Disaster Response Fund.

How are States Assisted During Natural Disasters?

- There is no official or defined category of "National Disasters".
- Disasters of this nature come under the Disaster Management Act 2005, which defines a **"disaster" as "a catastrophe, mishap, calamity** or grave occurrence in any area, arising from natural or man made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area".
- The Act saw the creation of the **National Disaster Management Authority (NDMA)**, to be headed by the Prime Minister, and State Disaster Management Authorities (SDMAs) headed by respective Chief Ministers.
    - The Act also led to the **National Disaster Response Force**. It has several battalions or teams, which are responsible for on-ground relief and rescue work in several states.

What is the National Disaster Relief Fund (NDRF) and State Disaster Response Fund (SDRF)?

- **NDRF:**
    - The NDRF is mentioned in the 2005 Disaster Management Act.
    - The NDRF supplements SDRF of a State, in case of a disaster of severe nature, provided adequate **funds are not available in SDRF.**
- **SDRF:**
    - The SDRF is constituted under Disaster Management Act, 2005.
    - SDRFs exist for the states and are the primary funds available to state governments for responses to notified disasters.
    - The Central Government contributes **75% to the SDRF in general states and 90% in northeastern and Himalayan states.**
    - The SDRF is to be used only for meeting the expenditure for providing immediate relief to the victims of notified calamities like Cyclones**,** Droughts**,** Earthquakes, Fires, Floods**,** Tsunamis, hailstorms, landslides, avalanches, cloud bursts, pest attacks and frost/cold waves.
        - According to a publication of the **National Disaster Management Authority** from November 2019, "The state government is primarily responsible for undertaking rescue, relief and rehabilitation measures in the event of a disaster." But these can be supplemented with Central assistance.

What is a Severe Calamity?

- **About:**
    - A severe calamity refers to a **catastrophic event or disaster** of significant magnitude and intensity that **causes widespread damage, loss of life, and disruption** to normal life.

    - When a calamity is declared to be of severe nature, it triggers a **specific procedure for disaster relief and financial assistance.**
- **Procedure for Disaster Relief in India:**
    - **Declaration:** The state government submits a memorandum detailing the extent of damage caused by the **disaster and its fund requirements for relief operations.**
    - **Assessment:** An inter-ministerial central team conducts an **on-the-spot assessment of the damage** and fund requirements for relief efforts.
    - **Committee Evaluation:** Committees examine the assessment reports, and a High-Level Committee must **approve the amount of immediate relief** to be released from the NDRF.
        - The Disaster Management Division of the Ministry of Home Affairs will then provide support and monitor the utilisation of funds.
    - **Financial Support**: SDRF is the primary fund available with State Governments for responses to notified disasters.
    - **Additional Assistance:** If the resources in the SDRF are insufficient, additional assistance **may be considered** from NDRF which is fully funded by the Centre.
        - Funds for the NDRF and SDRFs are allocated by the government as part of budgetary allocations.
    - **Loan Relief:** Relief measures may include **relief in repayment of loans** or the provision of fresh loans to affected individuals on concessional terms.
    - **Finance Commission**: Funds for immediate relief are recommended by the Finance Commission. The **15th Finance Commission** (for 2021-22 to 2025-26) adopted a new methodology for state-wise allocations, based on factors like past expenditure, risk exposure (area and population) hazard and vulnerability of states.
    - **Release of Funds:** Central contributions for disaster relief are released in two equal installments, subject to utilization certificates and reports on activities undertaken by the state governments.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Mains

Q. With reference to the National Disaster Management Authority (NDMA) guidelines, discuss the measures to be adopted to mitigate the impact of recent incidents of cloudbursts in many places of Uttarakhand. **(2016)**

Economic Insights Beyond GDP: ICOR

For Prelims: **Gross Domestic Product**, Incremental Capital Output Ratio, Harrod-Domar model, Unified Payments Interface**,** National Payments Corporation of India**,** Inflation**,** Informal sector.

For Mains: Factors Behind Declining ICOR in India, Limitations of Using ICOR as an Economic Indicator

Source: ET

Why in News?

India's latest **Gross Domestic Product (GDP)** data is making headlines with a remarkable **7.8% growth during the April to June quarter of 2023,** solidifying its position as one of the **world's fastest-**

growing major economies.

- However, India's economic narrative extends beyond the numerical figures. **Incremental Capital Output Ratio (ICOR)** is also gaining traction, offering insights into **capital efficiency and** resource allocation**.**

What is GDP and ICOR?

- **GDP** is one of the most widely used indicators of **economic performance and development.** It measures the **total value of goods and services produced within a country in a given period of time.**
    - While GDP has its merits, it **does not offer a complete view of economic well-being.** It overlooks factors like **efficiency, income distribution, and institutional quality**, which are essential for sustainable growth.
    - Merely increasing investment may inflate GDP, but true sustainable growth **relies on productivity enhancements.**
    - Therefore, economists and policymakers often use other complementary indicators to assess the **efficiency, sustainability, and quality of economic growth.**
- One such indicator is the **ICOR**; it has evolved from the **Harrod-Domar Growth Theory** and examines the **relationship between fresh investments and economic growth,** indicating how much additional capital is required to generate a **1% higher output.**
    - **A lower ICOR signifies greater efficiency** and productive use of capital.
    - According to an **SBI report**, India is experiencing an upward trend in savings and investments, which is accompanied by a simultaneous **decrease in the ICOR.**
        - The **current ICOR in India stands at 3.5 (as of FY22)**, however, this was 7.5 in FY12.

Note: The **Harrod-Domar model**, created by economists **Roy Harrod and Evsey Domar**, asserts that **economic growth relies on the availability of capital for investment**, and the rate of capital accumulation is directly linked to the rate of savings.

What are the Factors Behind Declining ICOR in India?

- **Economic and Technical Innovation:** India has been a hotbed for **cost-conscious innovation,** where companies develop **cost-effective solutions** that require minimal capital investment and minimum wear and tear replacement.
    - For example, companies like **Tata Motors developed the Nano car,** a low-cost alternative for the **middle-class population**, showcasing how frugal innovation can lead to lower ICORs.
- **Economic Diversification:** India's shift towards a **more services-oriented and technology-intensive economy** reduces the capital intensity of economic activities.
    - Services, such as **IT and software development,** typically require less capital per unit of output compared to traditional manufacturing.
        - **Unified Payments Interface (UPI)** developed by **National Payments Corporation of India (NPCI)** has become a **cost-effective and efficient digital payment system** that has accelerated **financial inclusion** and made transactions more accessible to a broader population.
    - However, it's essential to exercise caution and **maintain a balanced approach by also nurturing the manufacturing sector.**
- **Decentralized Manufacturing:** The rise of **decentralized and distributed manufacturing using** 3D printing and other technologies reduces the need for centralized factories and heavy capital investment in large-scale production facilities.
    - **India's first 3D-printed post office** has been inaugurated in Bengaluru.
- **AI and Machine Learning Integration: Artificial Intelligence** and **Machine learning (ML)** are playing a pivotal role in lowering the ICOR in India by enhancing efficiency and productivity across various sectors.

- For instance, in healthcare, **AI-driven diagnostics reduce reliance on costly equipment**, lowering the healthcare sector's ICOR.
- In manufacturing, **ML-based predictive maintenance** decreases downtime and extends machinery life, reducing the need for frequent capital replacements.
- Also, **AI-enabled** precision farming **in agriculture** enhances resource utilization, resulting in higher crop yields with reduced capital expenditure.

What are the Limitations of Using ICOR as an Economic Indicator?

- **Informal Economy Impact:** India's informal economy is **vast and dynamic,** but it **largely operates outside the scope of formal data collection.**
  - The informal sector's interactions with the formal sector can be complex and challenging to capture accurately in ICOR calculations.
  - As a result, **ICOR may not fully account for the** informal sector's **contribution to economic growth** and capital efficiency.
- **Price Distortions:** ICOR is based on **nominal values of investment and output**, which are affected by price changes over time.
  - Therefore, inflation **or** deflation **may distort the true relationship between investment and output,** leading to misleading results of ICOR.
  - Also, obtaining reliable ICOR calculations can be hindered by the availability and accuracy of data.
- **Infrastructure Bottlenecks**: Despite a declining ICOR, **India continues to grapple with infrastructure bottlenecks.**
  - This could mean that while **new capital investments are relatively efficient,** existing infrastructure constraints could hinder the overall economic efficiency and productivity.
- **Regional Disparities**: Regional variations in India can significantly affect the **interpretation of ICOR.** A declining national ICOR might **hide disparities where some regions benefit from more efficient capital use while others lag behind.**
- **Natural Resource Depletion**: A lower ICOR **may not reflect the depletion of** natural resources**,** which can lead to long-term sustainability challenges.
  - Capital-intensive industries that exploit natural resources might show a declining ICOR while harming the environment.

How can ICOR be Improved?

- **Regional and Sectoral Analysis:** Instead of only national-level analysis, **there is a need to conduct regional and sectoral assessments of ICOR.**
  - This allows for a more **granular understanding of where capital investments are most efficient and where improvements are needed.** Targeted policies can then be designed accordingly.
- **Blockchain for Transparent Data Recording:** Utilizing **blockchain technology to ensure transparent and tamper-proof recording of economic data,** can reduce the risk of data manipulation or inaccuracies. This can enhance the reliability of ICOR calculations.
- **Public-Private Collaboration**: Fostering collaboration between **public and private sectors to jointly address capital allocation inefficiencies.**
  - Public-private partnerships can **leverage resources, expertise, and innovation** for more efficient infrastructure and development projects.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims:

Q. Increase in absolute and per capita real GNP do not connote a higher level of economic development, if: (2018)

(a) Industrial output fails to keep pace with agricultural output.
(b) Agricultural output fails to keep pace with industrial output.
(c) Poverty and unemployment increase.

(d) Imports grow faster than exports.

Ans: (c)

Q. In a given year in India, official poverty lines are higher in some States than in others because: (2019)

(a) Poverty rates vary from State to State
(b) Price levels vary from State to State
(c) Gross State Product varies from State to State
(d) Quality of public distribution varies from State to State

Ans: (b)

Mains

Q1. Define potential GDP and explain its determinants. What are the factors that have been inhibiting India from realizing its potential GDP? **(2020)**

Q2. Explain the difference between computing methodology of India's Gross Domestic Product (GDP) before the year 2015 and after the year 2015. **(2021)**

Konark Wheel Shines at G-20 Summit Venue

Source: IE

Why in News?

The **18th G20 Summit** was held in New Delhi, for the first time on 9th -10th September 2023, under the theme **'One Earth, One Family, One Future'.**

- The venue of the summit was the **Bharat Mandapam Convention Centre in Pragati Maidan, New Delhi**. As part of showcasing India's cultural diversity and heritage, a wall depicting the **mural** of the **historic** Konark Wheel of Odisha's Sun Temple is placed as the backdrop for welcoming world leaders at the summit venue.

What are the Key Facts About Konark Sun Temple?

- **About:**
  - The Konark Sun Temple is a **13th-century CE** Sun temple at Konark**,** on the coastline in Puri district, Odisha, India.
  - The temple is attributed to **King Narasimhadeva I of the Eastern Ganga dynasty about 1250 CE.**
  - Dedicated to the **Hindu Sun God Surya**, the temple complex has the appearance of a **100-foot-high chariot with immense wheels and horses, all carved from stone.**
  - The temple is also a **UNESCO World Heritage Site** and a major pilgrimage site for Hindus and is depicted on the reverse side of the Indian currency note of 10 rupees.
  - The Sun Temple is the **culmination of Kalinga temple architecture.**
  - The temple was also called the **"Black Pagoda"** by European sailors as early as 1676 because it looked like a great tiered tower that appeared black. Similarly, the Jagannath Temple in Puri was called the **"White Pagoda."**
- **Key Features:**

- The temple represents a chariot of the **Sun God, with twelve pairs of wheels drawn by seven horses evoking its movement across the heavens.**
    - The wheels have **24 spokes that symbolize the 24 hours in a day.** The **wheels also function as sundials**, as the shadows cast by the spokes indicate the time of the day.
- The temple comprises several distinct and well-organized spatial units.
    - The **vimana (principal sanctuary)** was surmounted by a high tower with a **shikhara (crowning cap) also known as Rekha deul,** which was razed in the 19th century.
    - To the east, the **jahamogana (audience hall or Mandap)** dominates the ruins with its pyramidal mass.
    - Farther to the east, the **natmandir (dance hall)**, today unroofed, rises on a high platform.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. The Nagara, the Dravida and the Vesara are the (2012)

(a) three main racial groups of the Indian subcontinent

(b) three main linguistic divisions into which the languages of India can be classified

(c) three main styles of Indian temple architecture

(d) three main musical Gharanas prevalent in India

Ans: (c)

Mains

Q. Indian philosophy and tradition played a significant role in conceiving and shaping the monuments and their art in India. Discuss. **(2020)**

Q Safeguarding the Indian art heritage is the need of the moment. Discuss. **(2018)**

Earthquake in Morocco

Source: IE

Why in News?

The most powerful **earthquake** in Morocco's history struck late on the 8th of September 2023. The earthquake had a **magnitude of 6.8** and its epicenter was located in the **Al-Haouz province, within the Atlas Mountains near the historic city of Marrakech.**

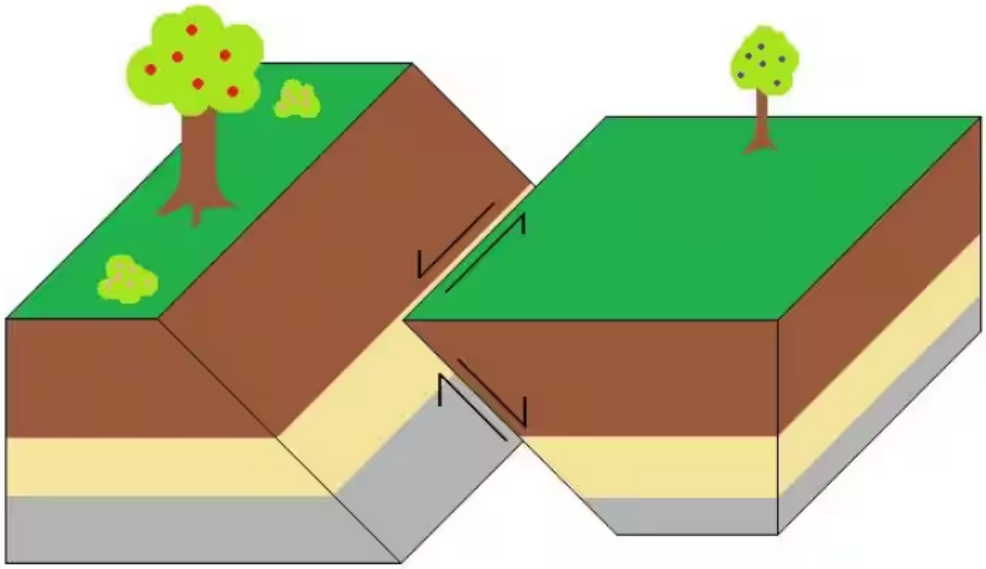
- A series of aftershocks, including a 4.9 magnitude tremor, added to the region's distress.

What are the Causes of the Earthquake in Morocco?

- The earthquake resulted from the **convergence of the** African plate and the Eurasian plate

along a complex plate boundary.

- The earthquake's faulting mechanism was classified as **"oblique-reverse,"** indicating movement along the **fault plane where the upper block moves up and over the lower block** within the Moroccan High Atlas Mountain range.
    - Faults are **fractures in rock formations** that **enable rock blocks to move relative to each other.** Rapid movement along faults can trigger earthquakes.
    - Faults are categorized by their **dip (angle with respect to the surface) and slip direction.**
        - **Dip-slip faults** include **normal faults (upper block moves down lower block)** and **reverse faults (upper block moves up and over lower block),** reverse faults are common in areas of tectonic compression.
        - **Strike-slip faults** involve **horizontal movement along the fault plane.**
        - **Oblique-slip faults** exhibit characteristics of **both dip-slip and strike-slip faults.**



Oblique-slip fault: Arrows represent relative movement.

- The earthquake occurred at a relatively **shallow depth beneath the Earth's surface**, which is a contributing factor to its destructive potential.
    - Shallow earthquakes **are more dangerous due to their proximity to the Earth's surface.**
        - They release more energy compared to deeper quakes, making them potentially more destructive.
    - Deeper earthquakes lose energy as seismic waves travel greater distances.

Key Facts About Morocco:

- Morocco is situated in western North Africa, directly across the **Strait of Gibraltar** from Spain.
- It shares borders with **Algeria to the east and southeast, the Western Sahara to the south**, and is surrounded by the **Atlantic Ocean to the west and the** Mediterranean Sea **to the north.**
- **Capital City : Rabat.**
- **Major Mountain Ranges**: The Atlas and Rif Mountains.
- **Morocco is situated on the** convergence plate **of Africa and Eurasia,** which are two of the major tectonic plates that make up the **Earth's crust**. These plates are constantly moving and colliding, creating mountains, volcanoes, earthquakes, and other geological features.
    - **The Atlas Mountains in Morocco** are a result of the collision between these plates, as they are squeezed and uplifted by the compressional forces.


SPAIN
Rabat
MOROCCO
Atlantic Ocean
ALGERIA
Western Sahara
MAURITANIA

EARTHQUAKE

ABOUT

- Shaking of the earth; caused due to release of energy, generating seismic waves in all directions

HYPOCENTER

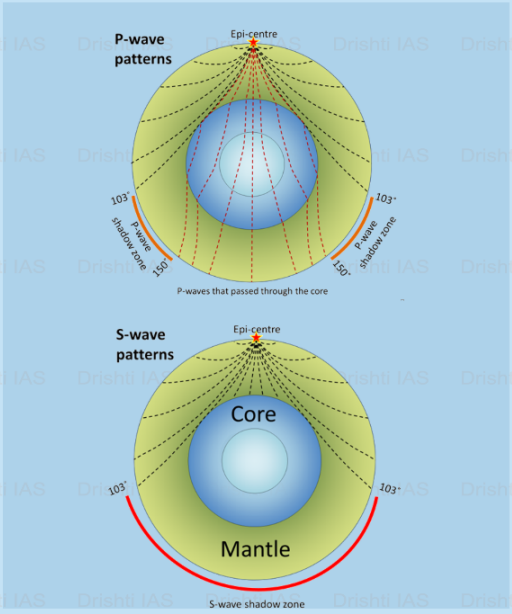
- Location where the earthquake starts (below earth's surface)

EPICENTER

- Location right above the Hypocenter (on the earth's surface)

EARTHQUAKE WAVES

- Body Waves: Move in all directions travelling through the body of the earth
  - P Waves: Move faster, First to arrive at surface, Similar to sound waves, Travel through gaseous, liquid and solid materials
  - S Waves: Arrive at surface with some time lag, Travel only through solid materials
- Surface Waves: Last to report on seismographs, More destructive, Cause displacement of rocks
  - Love Waves: Same motion as S-waves (horizontal) without vertical displacement, Sideways motion perpendicular to the direction of propagation, Faster than Rayleigh waves
  - Rayleigh Waves: Cause the ground to shake in an elliptical pattern, Spread out the most of all seismic waves, Move vertically and horizontally in a vertical plane



CAUSES OF EARTHQUAKES

- Release of energy along a Fault/Fault Zones (break in the crustal rocks)
- Movement of tectonic plates (most common)
- Volcanic eruption (stress changes in rock-injection/withdrawal of magma)
- Human activities (mining, explosion of chemical/nuclear devices etc.)

MEASURING EARTHQUAKE

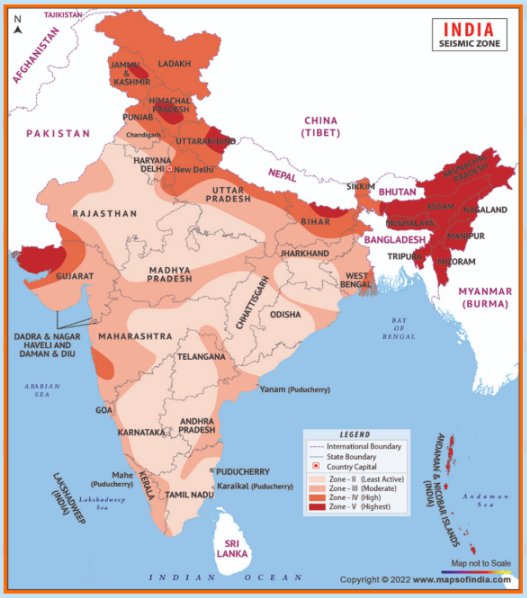
- Seismometers - Measures seismic waves
- Richter Scale - Measures magnitude (energy released; range: 0-10)
- Mercalli - Measures intensity (visible damage; range: 1-12)

DISTRIBUTION

- Circum-Pacific Belt - 81% of earthquakes
- Alpide Earthquake Belt - 17% of the largest earthquakes
- Mid-Atlantic Ridge - Mostly submerged underwater

EARTHQUAKE IN INDIA

- India is one of the highly earthquake affected countries due to the presence of technically active mountains - the Himalayas.
- India has been divided into 4 seismic zones (II, III, IV, and V)



Drishti IAS

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. Consider the following: (2013)

1. Electromagnetic radiation
2. Geothermal energy
3. Gravitational force
4. Plate movements
5. Rotation of the earth
6. Revolution of the earth

Which of the above are responsible for bringing dynamic changes on the surface of the earth?

(a) 1, 2, 3 and 4 only
(b) 1, 3, 5 and 6 only
(c) 2, 4, 5 and 6 only
(d) 1, 2, 3, 4, 5 and 6

Ans: (d)

Mains

Q. Why are the world's fold mountain systems located along the margins of continents? Bring out the association between the global distribution of fold mountains and earthquakes and volcanoes. **(2014)**

Q. Discuss about the vulnerability of India to earthquake related hazards. Give examples including the salient features of major disasters caused by earthquakes in different parts of India during the last three decades. **(2021)**

Rapid Fire Current Affairs

President Calls for Protecting Farmers' Rights and Traditional Seed Varieties

- The President of India inaugurated the **First Global Symposium on Farmers' Rights** in New Delhi, organized by the **International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)** and the **Food and Agriculture Organization (FAO)** to address farmers' rights.
- The essential role of farmers as 'anna daatas' **(providers of food)** was highlighted and called for the **protection of their rights and future.**
    - India, with just **2.4% of the world's land area, accounts for 7-8% of all recorded plant and animal species,** thanks to farmers' efforts in conserving local varieties, domesticating wild plants, and nurturing traditional crop varieties, which have ensured **food and nutritional security for humans and animals.**
- The President also presented the **Plant Genome Saviour Farmer Reward** 2021-22 to **recognise the efforts of farmers** who have **bred and developed new plant varieties.**
    - **The reward includes a citation, memento, and cash amount of Rs 1,50,000.**

Read more: Plant Genome Saviour Farmer Reward

World Duchenne Muscular Dystrophy Day

World Duchenne Muscular Dystrophy (DMD) Day observed annually on **7th September,** aims to **raise awareness about DMD** and improve the lives of individuals affected by this rare degenerative illness.

- The theme for this year's World DMD Day is "**Duchenne: Breaking Barriers."**
- DMD is a rare genetic condition that **weakens muscles progressively** and affects **approximately one in every five thousand boys.**
    - The condition results from an X-chromosome **mutation** and leads to difficulties in walking, followed by the **impairment of other motor functions.**
    - Ultimately, DMD affects vital functions like **breathing and heart function since the heart is a muscle too.**
        - Currently, there is no known cure for DMD. Treatment aims to control symptoms to improve quality of life.
- The Department of Empowerment of Persons with Disabilities (DEPwD) under the Ministry of Social Justice and Empowerment, is actively involved in creating awareness about DMD.

Read more: Treatment for Duchenne Muscular Dystrophy

Defence Minister Inaugurates 90 Border Infrastructure Projects Across India

The **Defence Minister** inaugurated a total of 90 border infrastructure projects to enhance all-weather connectivity and military readiness along the **Line of Actual Control (LAC).**

- Notable among them is the **Nechiphu tunnel in Arunachal Pradesh,** which will provide year-round connectivity to the **strategically vital** Tawang sector.
- Additionally, the construction of the **Shinku La tunnel,** the world's highest tunnel, will provide all-weather connectivity to the **Lahaul-Spiti region in Himachal Pradesh.**

Read more: Line of Actual Control

Libya's Catastrophic Flooding

Recently, **Eastern** Libya experienced a catastrophic event as **floods** caused by **Storm Daniel**, brought widespread destruction.

- Decades of war and a **lack of a central government have resulted in deteriorating infrastructure,** making the country highly susceptible to the recent torrential rains.
- **Libya is the only nation without a** climate strategy**, as per the** United Nations.
- This catastrophe underscores the urgent **need for stability, unity, and comprehensive governance in Libya,** as it continues to grapple with multiple crises, from internal unrest to the exploitation of migrants and oil revenue disputes.

Read more: Conflict in Libya, Perennial Disaster - Floods
