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(Useful for UPSC/WBPSC/SSC Exams.)

ASC (Rakashi or devil fish) was **introduced in India for its unique appearance and its ability to clean algal growth** in tanks and aquaria, however, now they have **grown exponentially**.

- It is **native to South America**, and belongs to the **largest catfish family**.
- Scientists **used the Environmental DNA (eDNA) approach** for mapping spread of the invasive species.
eDNA is organismal DNA that is **released in the environment from cellular material shed by organisms** (via skin, excrement, etc.) into **aquatic or terrestrial environments**.
Unlike conventional methods, eDNA approach is **reliable, and accurate, can be done at a low cost**.

About Invasive species (IS)

- **Definition:** As per the **Wildlife Protection Act, 1972** (amended in 2022), IS are **non-native species** whose introduction or spread poses a **threat to wildlife or its habitat**. **Threats**
- Their presence can lead to **changes in food chains, disturbances in ecological balances**, and competition with native species **for resources**.
Put **human health, food security and livelihoods at risk**.
1 in 10 species on the IUCN Red List species are threatened by IS (IUCN).
Resulted in loss of at least **USD 1.288 trillion from 1970 to 2017** (IUCN).

A G-5 level geomagnetic storm, the first since the Halloween Storms of 2003, has struck Earth.

- This storm was **triggered by multiple Coronal Mass Ejections (CMEs)** directed towards Earth.

Geomagnetic Storms

- **Definition:** Geomagnetic or Solar storms are **disturbances in Earth's magnetosphere** (Earth's magnetic field).
- **Classification:** Depending on the intensity, they are classified from **G1** (Minor) to **G5** (extreme).
- **Caused by:** These disturbances arise from the **interaction of charged particles from Sun with Earth's magnetic fields**, which is triggered by following solar explosions:
 - ◆ **CMEs:** Primary drivers of the **most severe geomagnetic storms**.
 - ◆ They are **large expulsions of plasma and magnetic fields from the Sun's corona** (the outermost part of the Sun's atmosphere).
 - ◆ They usually **take place around sunspot groups**, which are **cooler, highly magnetized** areas on the Sun's surface.
 - ◆ They typically take **1 to 3 days to reach Earth**.
 - ⊕ **Solar Flares:** An **intense burst of radiation** coming from the release of **magnetic energy associated with sunspots**.
 - ◆ **Largest explosive events** in our Solar system that can **last from minutes to hours**.
 - ◆ They travel at the speed of light, which takes approximately **8 minutes to reach Earth**.

ISRO successfully conducts hot testing of 3D printed rocket engine

ISRO successfully conducts hot testing of liquid rocket engine – PS4 engine (fourth stage of PSLV) – manufactured through Additive Manufacturing (AM) technology.

- It was developed by the Liquid Propulsion Systems Centre (LPSC), ISRO. It resulted in saving of raw material usage and production time.

AM / 3D Printing

- It is defined as the technology that constructs a **three-dimensional object** from a digital 3D model by **adding material layer by layer**.
- It is the **opposite of subtractive (traditional) manufacturing**, in which an object is created by cutting away at a solid block of material.
- AM materials** include thermoplastics, metal and metal alloys, ceramics and biomaterials such as bioinks.

Key Applications of AM technology:

- Healthcare** – Custom implants, tumour models, surgical instruments etc. **Aerospace and defence** – Components like airframes, landing gears, drones etc. **Electronics** – Wearable devices, robots, RFID devices etc.
- Others** – Construction, consumer goods including clothing, furniture, automotive etc.

Advantages of AM technology: Lower inventory, reduced time, creating complex and custom designs, little wastage, create objects with functionally-graded materials etc.

Challenges:

- Expensive:** Initial investment in equipment is substantial.
- Technical Challenges:** Slow production speed, quality concerns, and lack of international standards.
- Other Challenges:** Workforce shortage, lack of material availability, design integration etc.

Steps taken by Government:

- Ministry of Electronics and Information Technology (MeitY)** released “National Strategy for Additive Manufacturing” in 2022. **National Institute of Electronics & Information Technology, Aurangabad**, has established a **3D printing lab**.
- In 2023, **National Centre for Additive Manufacturing** was set up by MeitY in collaboration with the **Government of Telangana**.

Ultra-processed food (UPF) Consumption linked to risk of early death

A 30-year-long U.S. study found that consuming UPF is associated with a **higher risk of early death**.

- The risk was **especially** associated with products like **ready-to-eat meats, sugary drinks, dairy desserts, and processed breakfast foods**.
- However, researchers also clarified that **not all UPF should be universally restricted**, but findings support limiting certain types for long-term health.
- Researchers used the **Alternative Healthy Eating Index-2010 (AHEI) score** to assess overall dietary quality.
 - AHEI, developed by Harvard School of Public Health, **assigns ratings to foods and nutrients predictive of chronic disease**.

About UPF

- UPFs are a **category of food products** that have **undergone extensive processing** and contain **significant amounts of additives** (like preservatives, artificial flavours, emulsifiers).
- They are often **High in fat, Sugar and Salt (HFSS)** and low in Vitamins, protein, and fibre. For example, snacks, sodas, etc.
- Their increased consumptions may lead to various health issues including **hypertension, renal failure, obesity, fatty liver disease, metabolic syndrome, cardiovascular diseases, etc.**
- UPF food sector in India witnessed a compounded annual growth rate of **13.4% between 2011 and 2021 and is expected to grow further (WHO)**.

Challenges in curbing UPF consumption in India

- Changing lifestyle** and dietary pattern.
- Absence of a clear definition** and coverage of HFSS food.
- Lack of comprehensive advertisement** and marketing regulations.

Indian Initiatives to Curb UPF Consumption

- Revised (2024) dietary Guidelines for Indians** by Indian Council of Medical Research.
- Eat Right India Campaign** by Food Safety and Standards Authority of India (FSSAI) to ensure safe and wholesome food.
- FSSAI **limits trans fatty acids (TFA)** in food products to 2% by mass of the total oils and fats.
- Aerated beverages in India** are taxed at **28% GST and additional 12% compensation cess**.
- High-fat sugar Salt (HFSS) foods** in India are taxed at a 12% Goods and Services Tax (GST) rate.
- Kerala** had also introduced a ‘**fat tax**’ in 2016.

Sudden Dust Storm envelops Delhi

Delhi witnessed a sudden dust storm with **strong winds and light rain**.

- It was the result of a combination of factors including a **western disturbance, easterly winds, and high temperatures** that led to the formation of **convective clouds and strong winds**.

About Dust Storms:

- Dust storms are created when **strong and turbulent winds lift up particles of dust/sand** to great height.
- A dust storm is associated with a **thunderstorm (characterized by rain and lightning)** and generally occurs in **arid and semi-arid regions**.
These are frequent in northern Africa, Middle East, Central Asia and North India.
Northwest India experiences **convective dust storms**, locally called "**aandhi**" with frequency being maximum over **Rajasthan** followed by **Haryana, Punjab and West Uttar Pradesh**.
- According to **Intergovernmental Panel on Climate Change**, the severity and frequency of **dust storms** will rise due to **rising global temperature**.

Impact of Dust Storms

- These can trigger **respiratory ailments** in humans. Dust particles act as a carrier for **infectious diseases**.
- These can **destroy crops, reduce visibility** and ground flights.
- These transport nutrients to the oceans and **affect marine biomass production**.

About Western Disturbances (WD)

WD are **extratropical storms** which form in **Mediterranean region and travel eastward towards Indian subcontinent**.

WD cause **non-monsoonal rain in the northwestern Indian subcontinent**.

About Easterlies (Trade winds)

They are **constant winds** that blow from **east to west near the equator**.

Trade winds begin as **warm, moist air from the equator** rises in the atmosphere and cooler air closer to the poles sinks.

Sahitya Akademi

Ruskin Bond was awarded the **Sahitya Akademi Fellowship**.

- Fellowship is the **highest honour** conferred by Akademi on a writer.
- It is reserved for '**the immortals of literature**'.
- Major literary of Ruskin Bond:** Vagrants in the Valley, Once Upon a Monsoon Time, Angry River, Strangers in the Night, All Roads Lead to Ganga, etc.

About Sahitya Akademi

- Genesis:** Formally inaugurated in **1954** and Registered under the **Societies Registration Act, 1860**.
- Ministry:** An autonomous body under **Ministry of Culture**.
- Role:** Undertakes **literary activities in 24 languages** (22 scheduled languages and **English and Rajasthani**).
- Its major awards:** Sahitya Akademi Award, Bhasha Samman

Supreme Court passed judgement to strengthen Juvenile Justice Act, 2015

Supreme Court's judgement in "**Child in Conflict with Law (CCL) through his mother v. State of Karnataka**" case dealt with act's provision for **preliminary assessment of CCL** in heinous offences.

About Juvenile Justice (Care and Protection of Children) Act (JJ Act) 2015

Scope: It consolidates and amend the law relating to CCL and Child in need of Care and Protection (CCP).

CCL means **child below 18 years of age who is alleged/ found to have committed an offense**.

Board: It mandates setting up **Juvenile Justice Boards (JJBs) in every district** to deal with cases of CCL.

Preliminary Assessment: In case of **heinous offences** alleged to have been committed by a **child above 16 years of age**, JJB shall conduct a **preliminary assessment** to assess capacity of the child.

After preliminary assessment, the **Children's Court** may decide that **whether the child can be tried as adult**.

Key Highlights of Judgement

An **appeal** against the **preliminary assessment order of the Juvenile Justice Board (JJB)** would be **filed before the Children's Court (not Sessions Court)** wherever available.

Also, court has prescribed **30 days time limit** for preferring such appeals.

The time period of **3 months** prescribed for completion of **preliminary assessment is not mandatory** but merely directory in nature.

Kaziranga National Park (KNP)

KNP collected the highest revenue in its 50-year history.

About KNP

Location: **Golaghat and Nagaon districts (Assam)** in the **Eastern Himalayan biodiversity hotspots**.

Situated between the **river Brahmaputra** in the North and the **Karbi Anglong hills** in the South.

- UNESCO recognition:** Declares as a **UNESCO World Heritage Site** in 1985.
- Major Vegetation:** **Wet alluvial grassland** interspersed with **deciduous to semi-evergreen woodlands**.
- Flora:** Elephant grass, Kumbhi, Indian gooseberry etc.
- Fauna:** One-horned rhinoceroses (the world's largest population), wild Asiatic water buffaloes, swamp deer, hog deer, Ganges Dolphin, etc.



Small Ribonucleic acid (sRNA)

Researchers found **altered food habits in C. elegans worms** after they ate a **disease-causing bacteria (P. vranovensis) that produces sRNA.**

About sRNA

- ▶ sRNA is a **group of primarily non-coding RNA (ncRNA)** and generally contains **20 to 200 nucleotides.**
 - ⊖ ncRNA refers to **RNA that does not encode a protein.**
 - ⊕ **Ribonucleic acid (RNA)** is made up of 4 types of nucleotides **adenine (A), uracil (U), cytosine (C) or guanine (G).**
- ▶ They bind to **other proteins and RNAs**, and either **enhance or reduce the expression of other genes.**

Measles

Researchers from Ministry of Health and Family Welfare and Banaras Hindu University found that **12% of India's eligible children received no dose of measles vaccine.**

Measles

- ▶ **About:** Measles is an **acute viral respiratory illness.**
- ▶ **Symptoms:** High fever, cough, coryza, and conjunctivitis (the three "C" s) and rash.
- ▶ **Pathogen:** Measles virus (a single-stranded, enveloped RNA virus).
- ▶ **Hosts:** Humans are the only natural hosts.
- ▶ **Vaccines:** **Measles Rubella (MR) vaccine** is part of India's **Universal Immunization Programme** since 2017.
Rubella virus infection usually causes a mild fever and rash.

Flue Gas Desulphurisation (FGD) Technology

Ministry of Power held a meeting to review a study conducted by IIT-Delhi on the **effect of installing Flue Gas Desulphurisation (FGD) technology** on Sulphur Dioxide (SO₂) emissions.

- ▶ Ministry of Environment, Forest & Climate Change made it **mandatory for all coal-based TPP** to install FGD system.

About FGD Technology

- ▶ It is used to **remove SO₂ from the flue gas emissions** of coal-fired Thermal Power Plants (TPP).
FGD systems can remove over **90% of SO₂.**
- ▶ Majorly, **three types of FGD systems – Dry Sorbent (Limestone) Injection, Wet Limestone Based, and Sea Water Based –** are adopted worldwide.

Asaf Ali (1888-1953)

- ▶ The birth anniversary of Asaf Ali celebrated.

About Asaf Ali

- ▶ Lawyer, freedom fighter, first Ambassador of independent India to the United States etc.

Key Contributions

- ▶ **One of the founding members of Home Rule League** at Delhi.
- ▶ Actively participated in the **Non-Cooperation Movement, Civil Disobedience Movement, Individual Satyagraha and Quit India Movement** etc.
- ▶ **Defended Shaheed Bhagat Singh and Batukeshwar Dutt** in central assembly bomb case 1929. Elected to
- ▶ **Central Legislative Assembly in 1935** as a member of Muslim National Party.

Values

- ▶ Patriotism, Leadership, Rationality etc.



Sea Anemone

Scientists have found **mass sea anemone bleaching off Agatti island, Lakshadweep.**

About Sea anemone:

- ▶ They are **ocean-dwelling members of the phylum Cnidaria.**
- ▶ Sea anemones are **predatory animals** and most species are found in **coastal tropical waters.**
- ▶ Like corals, sea anemones establish **symbiotic relationships with green algae.**

Sea surface temperature rise disrupts this relationship, resulting in **bleaching.**

They also have a **symbiotic relation with clownfish.**

Clownfish are protected by the **stinging tentacles of anemone** and anemone gets food from Clownfish's meals.

They play key **biogeochemical roles in benthic ecosystems.**

DigiLocker

10th and 12th standard students from CISCE board can now obtain verified marksheets through **DigiLocker platform.**

About DigiLocker Platform

Launched in 2015, it is a flagship initiative of **Ministry of Electronics and Information Technology** under **Digital India** program.

It is a **secure cloud-based platform** for issuance and **verification of documents & certificates** in digital way.

These digital documents are **legally valid documents** under **Indian Information Technology (IT) Act 2000.**

According to IT Rules, 2016, these are treated at par with **original physical documents.**

Benefits: Reduced Administrative cost, Paperless Governance, Real Time Verification etc.

Exercise 'Shakti'

7th edition of Exercise 'Shakti', a joint military exercise between **India and France**, started in Meghalaya.