UPSC Daily Current Affairs| Prelim Bits 13-06-2025

CROPIC (Collection of Real Time Observations & Photo of Crops)

Prelims : Current events of National Importance | Technology | Agriculture

Why in News?

The Ministry of Agriculture and Farmers Welfare plans to launch CROPIC.

- It is a study to ***gather crop information*** using field photographs and AI-based models.
- Crops will be photographed 4-5 times during their cycle, and the pictures will be analysed to assess their health and potential mid-season losses.
- **Seasons -** The study will be carried out for two seasons, kharif 2025 and rabi 2025-26.
- CROPIC is an initiative under Pradhan Mantri Fasal Bima Yojana (PMFBY).
- **Purpose** - It has a dual purpose of monitoring crop health and stress, and automation of crop loss assessment and payment of claims to affected farmers.
- The study envisages the collection of field photographs during the crop season using the CROPIC mobile app.
    - **Developed by -** Union Ministry of Agriculture and Farmers' Welfare.
- The photographs from the field will be crowd-sourced directly from farmers.
- Then, they will be analysed for information including crop type, crop stage, crop damage and its extent.
- CROPIC will use an AI-based cloud platform for photo analysis and information extraction, and a web-based dashboard for visualisation.
- **Timeline -** CROPIC will be rolled out initially in at least 50 districts per season.
- These districts will be well distributed in different agro-climatic zones, covering the 3 major notified crops in each district for each season, initially.

Notified crops are those covered under insurance schemes like PMFBY.

- **Benefits -** It will assist in creating a rich directory of crop signatures, and will also lead to automation of loss assessment and compensation to eligible farmers under PMFBY.
- This initiative is part of digital innovations in agriculture for fostering financial resilience.

Pradhan Mantri Fasal Bima Yojana (PMFBY)

• It is a crop insurance scheme designed to protect farmers against crop losses due to various natural calamities, pests, and diseases.
• **Aim** - To provide financial support, stabilize farmer income, and encourage the adoption of modern agricultural practices.
• **Key Features -** PMFBY provides insurance coverage for a wide range of crops, including rice, wheat, pulses, and commercial crops.
• The scheme offers low premium rates, with the government bearing the balance premium to ensure full insurance coverage.
• PMFBY utilizes technology like satellite imagery and remote sensing for crop area estimation, yield estimation, and loss assessment.
• The scheme streamlines the claims process, making it easier for farmers to access insurance benefits.

Reference

The Indian Express | What is CROPIC?

Delay in Axiom-4 Mission

Prelims : Current events of National Importance | Science

Why in News?

Axiom-4 mission to the International Space Station (ISS) would be postponed indefinitely after a liquid oxygen (LOX) leak in SpaceX's Falcon-9 rocket.

- **Axiom-4 Mission** – It is the 4th mission planned by US-based spaceflight company Axiom Space to the International Space Station.
- **Agency -** Axiom Space.
- It uses a *SpaceX Crew Dragon spacecraft*.
- The mission is *commercial* and isn't part of the regular resupply missions NASA undertakes to the ISS.
- It aims to facilitate commercial activities in space, including scientific research, technological development, and space tourism.
- It consists of a crew of 4 people - Peggy Whitson, Shubhanshu Shukla (Indian), Sławosz Uznański-Wiśniewski, and Tobir Kapu.
- **Reason for delay -** Falcon-9 rocket's engines leaking liquid oxygen (LOX).

  Liquid oxygen (LOX) is oxygen in its liquid state, a cryogenic fluid produced by cooling oxygen gas to its boiling point of -183°C (-297°F).

- If LOX is exposed to warmer conditions, the oxygen will turn into gas and *not be usable as fuel.*
- Falcon 9 engines combust a mix of rocket-grade kerosene and LOX to generate thrust, meaning a LOX leak is a serious issue.
- **Detectability issue -** When it leaks, LOX flashes to an invisible vapour almost

instantly and can be blown away by winds or fans nearby.
- Detecting it often entails time-consuming, labour-intensive work.
- Many joints in the components associated with storing and pumping LOX are insulated with foam or are located in nooks, and can't physically reach them.
- Materials contract at cryogenic temperatures (around 90 K), so a hole may appear closed at ambient temperature but open at cryogenic temperatures.
- So once a hole has been fixed, engineers may need to repeat tests at both warm and cold conditions or test with liquid nitrogen to mimic operating conditions.
- Testing with LOX itself can be hazardous.
- Fortunately, experts have been working with cryogenic engines for long enough to know which tools to use and which processes to follow once the leak has been identified.
- They include visual inspection, bubble tests, helium signature tests, flow-meter tests, ultrasonic microphones, and thermal imaging.

Reference

The Hindu | Why has the Axiom-4 mission been delayed?

New species of fireflies

Prelims : Current events of National Importance | Conservation

Why in News?

Bethune College, Kolkata assistant professor Srinjana discovered 2 new species of fireflies.

- **Discovered species -** Triangulara sunderbanensis and Medeopteryx bengalensis.
- **Triangulara sunderbanensis** – It is found at the Sunderbans Sunderban Biosphere Reserve, a world heritage site.
- It is the 2nd species to be discovered in the world under the Triangulara genus. The other was recorded in Thailand.
- **Medeopteryx bengalensis –** It is found near Thakurpukur, Kolkata.
- It is the 1st discovery of a new species under the Medeopteryx genus in India. This is the 26th species of this genus to be discovered.
- **Threats**
  - Use of pesticides,
  - disappearance of habitats like water bodies and associated plants,
  - changes in the distribution of earthworms and molluscs that firefly larvae feed on,
  - encroachment of invasive species, and
  - exposure to automobile exhaust and heavy metals.
- The most significant factor affecting the firefly population is ***artificial light pollution.***
- The light in fireflies is a cold light caused *by an enzymatic reaction*.
- The light they emit plays an important role in courtship signals during the mating

season.

- When exposed to artificial light, their signal gets masked, which affects mating and their reproduction.
- The disappearance of the insect has also affected the food chain of frogs and birds. Fireflies also act as *potential pollinators.*



Reference

Times of India | New Species of Fireflies

Early Harappan settlement in Gujarat

Prelims : Current events of National Importance | History

Why in News?

Archaeologists from the University of Kerala have unearthed a 5,300-year-old settlement near Lakhapar village in western Kachchh, Gujarat.

- The excavation has revealed an Early Harappan habitation site, located near the now-quiet ***Gandi River***, once a perennial water source.
- It provides critical habitation context to those burials, suggesting a dynamic, interconnected cultural landscape in the arid Kachchh desert.
- **Architecture** - The excavation uncovered structural remnants, walls made of local sandstone and shale, indicating well-planned construction activities.
- **Pottery** - It has the presence of pottery from both Early and Classical Harappan phases, dating back to around 3300 BC.
- Among these finds is the extremely rare Pre-Prabhas Ware, previously known from only 3 sites across Gujarat.

  Pre-Prabhas Ware refers to a distinct ceramic tradition found in Gujarat during the Early Harappan period, characterized by Fine Red Ware, Coarse Gray or Red Ware, Fine Gray Ware, and Black and Red Ware.

- The presence of this distinct ceramic tradition at Lakhapar points to a culturally

unique group within the larger Harappan civilization.

- **Burial site –** They discovered a human burial in the vicinity of the settlement.
- The skeleton, though poorly preserved, was interred directly in a pit with no visible architecture or markers and ***accompanied by Pre-Prabhas Ware pottery.***
- This is the 1st known burial to include this rare ware, hinting at a previously undocumented ritual practice or subgroup within the Early Harappan population.
- **Discovered Artefacts** - Semiprecious stone beads made of carnelian, agate, amazonite, and steatite; shell ornaments, copper and terracotta objects and lithic tools.
- Of particular note are Rohri chert blades, which indicate connections with the Sindh region.
- **Animal remains -** Cattle, sheep, goats, fish bones, and edible shell fragments, suggest that inhabitants relied on both animal husbandry and aquatic resources.
- Samples have also been collected for archaeobotanical analysis to understand plant use and ancient diet.
- Lakhapar bridges that critical gap, offering a rare glimpse into both the living and the dead of the same cultural group.

Reference

The Hindu | Early Harappan settlement in Gujarat

India's first electronic waste (e-waste) eco park

Prelims : Current events of National Importance | Environment

Why in News?

The environment minister recently announced that the Delhi government has undertaken a project to develop India's first electronic waste (e-waste) eco park in north Delhi's Holambi Kalan.

- The facility will be built under a ***design, build, finance, operate, and transfer (DBFOT) model.***
- It will be on a *public-private partnership (PPP) basis* for a concession period of 15 years.
- It will be designed to process *up to 51,000 tonnes* of e-waste, including *all 106 categories of waste listed under the E-Waste Management Rules, 2022.*
- Construction of the park is expected to be completed within 18 months, to process ***25% of e-waste*** within 5 years.
- It is expected to generate over Rs. 350 Crore in revenue.
- The project is expected to create thousands of green jobs while reducing pollution and conserving resources.
- The park will also have dedicated zones for dismantling, refurbishing, plastic recovery, and a second-hand electronics market.
- **Circular Economy & Sustainable Development** – This project embodies the

principles of a circular economy by minimizing waste, conserving resources, and creating a closed-loop system for electronic goods.
- It aligns with India's sustainable development goals.
- **Green Jobs & Skilling** – It will formalize the informal e-waste sector by establishing training centres to upskill workers, ensuring safer practices and creating thousands of "green jobs."
- **National Benchmark** – As one of four planned facilities nationally, it will serve as a model for other states, aiming to process 25% of Delhi's e-waste within five years.
- **Environmental Impact** – It directly tackles the hazards of improper e-waste disposal, reducing pollution (soil, water, air) from toxic elements and conserving valuable metals.

Reference

The Hindu | India’s first e-waste recycling park