UPSC Daily Current Affairs| Prelimbits 17-07-2025

Fuel Switch

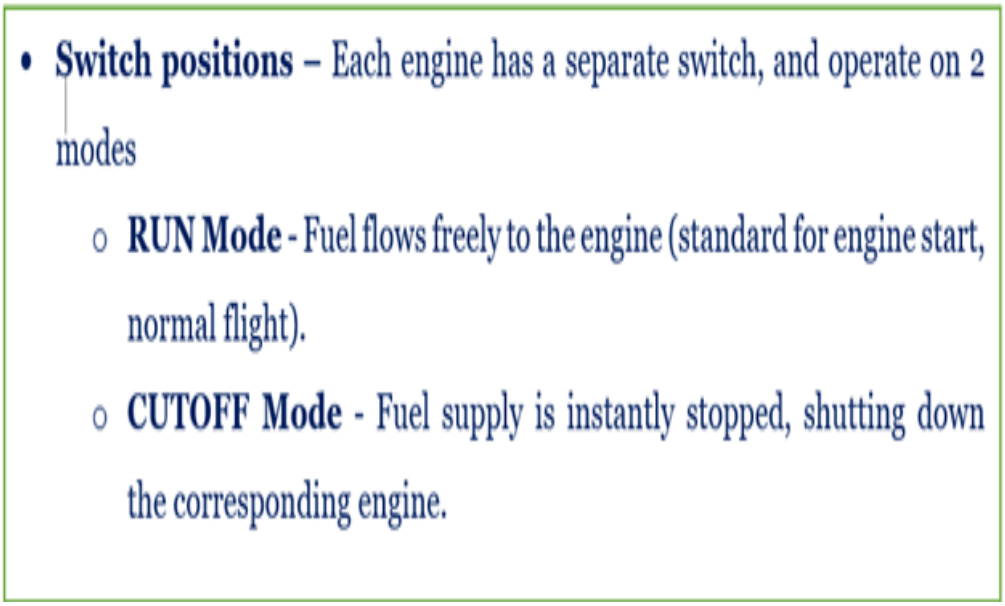
Prelims: *Current Events of National and International Importance*

Why in news?

Fuel control switches on Boeing 787-8 aircraft have come under scrutiny after Air India plane crash in Ahmedabad, prompting discussions about their design, operation & potential role in aviation incidents.

Fuel switch

- **Function** – Fuel switch controls are critical in cockpit, by which the fuel supply to the 2 engines is regulated.
- **Primary purpose** – During the aircraft ground operation the switch is used to start or shut down the engines.
    - In the event of an inflight emergency like engine failure or fire, switches are used to manually stop or restart an engine.
- **Switch location** - Placed inside the cockpit, directly below and behind throttle levers between pilots' seats.
    - **Positioned** - where pilots' hands rest easily during critical flight phases.



- **Metal Guard brackets** - Deployed to prevent accidental contact or movement.
- **Spring-locking system** – To move a switch from RUN to CUTOFF it require lifting of switch before sliding, designed to prevent accidents.

- **Operation sequence** - Engine starts by moving switches to RUN mode on ground.
    - During flight - Switches remain in RUN unless an engine fire or severe failure occurs.
    - Switches moved to CUTOFF after landing or during maintenance
- **Consequences of CUTOFF –** Immediately stops fuel flow to the corresponding engine, causing it to shut down, lose thrust, and disable engine-driven generators, potentially impacting electrical systems.
- **Emergency use** – In case of fire or critical fault, a red light cue illuminates, signaling the crew to shut down the engine immediately.
    - Moving to CUTOFF instantly stops fuel flow and disables engine generators, impacting the electrical systems.
- **Redundant systems** - are powered and wired separately, so one failure doesn't compromise the backup.
- **Example** - Multiple independent circuits allow safe operation even if one fails.
- **Power supply** - Redundant generators/ Accelerated Processing Unit (APU)/Ram Air turbine keep critical systems running.
- **Flight controls** - Multiple computers compare inputs, override faulty data automatically.
- **Reactivation**– If switch accidentally turned off by the pilot, the aircraft's systems try attempt an **automatic engine** relight and reintroduce fuel when switch turns to RUN.
- **Accident causing** - Is highly unlikely due to safeguards, but possible under human stress or miscommunication.
- **Industry practice** - Most airlines, including Air India, comply with existing safety features unless directed otherwise by regulators.

Reference

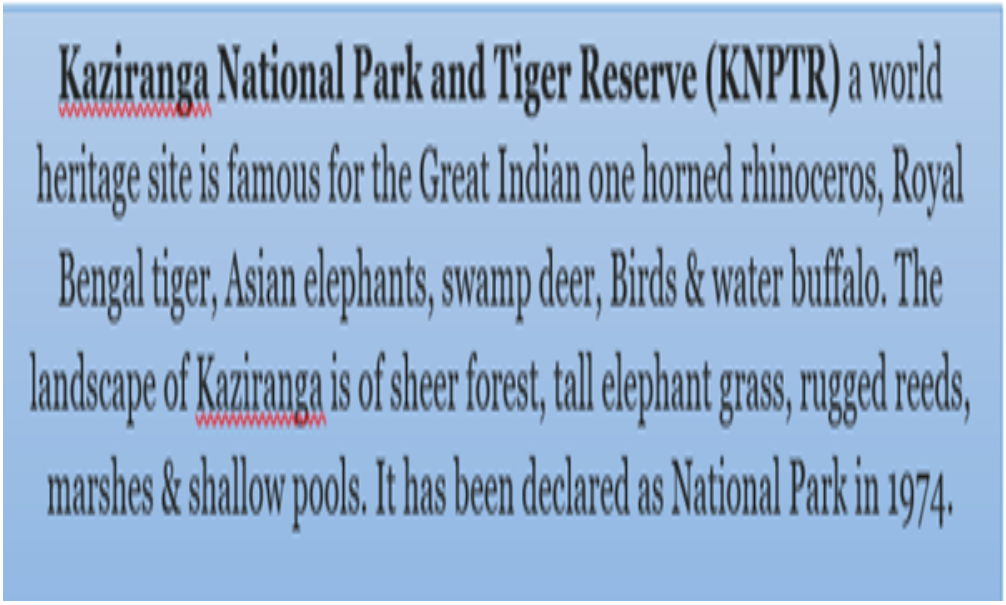
The Hindu| Fuel Switches In Aircrafts

Grassland Birds Census

Prelims: *Current events of national and international importance -Science and Technology.*

Why in News?

Recently, the first ever grassland birds census was conducted in Kaziranga National Park and Tiger Reserve (KNPTR) in Assam.



- **Conducted across** - 185 grassland points within KNPTR
- **Major Findings of the census**
- **Species under threat** - Identified 43 species which are under threat in other major bird habitats in the country due to habitat loss and fragmentation.
- **Identified** - **1** critically endangered species, **2** endangered, 6 vulnerable and **1** species in near threatened category.
- **Habitat analysis** - Birds occupy a variety of grassland ecosystems, with tall, wet grasslands.
- Other common habitats included tall grasslands, short grass/open fields & scrub grasslands.
- **Richest grassland habitats in India** - Maharashtra, Gujarat, and West Bengal are among the richest in terms of grassland bird diversity in India.
- **Threats** - Habitat loss and fragmentation.
- **Emphasis on** - 10 focal species that are either globally threatened or endemic to the Brahmaputra floodplains. These birds are:-
    - Bengal Florican, Swamp Francolin, **Finn's Weaver**, Swamp Grass Babbler, Jerdon's Babbler, Slender-billed Babbler, Black-breasted Parrotbill, Marsh Babbler, Bristled Grassbird, and Indian Grassbird.
- The breeding colony of **Finn's Weaver** was particularly documented.

Quick facts

Finn's weaver
• **Locally called** - 'Tukura sorai' • **Scientific name** - Ploceus megarhynchus • **IUCN status** – Endangered. • This remarkable bird is a LIFER for many birdwatchers • **Indicator** - Serve as ecological indicators of the health and integrity of floodplain grasslands. • **Habitat** - Nest-builder atop trees.

*A **Lifer Bird** refers to a bird species that a birder sees and identifies for the first time in their life.*

Reference

Deccan Herald| Grassland Bird Census in Kaziranga

Cnemaspis brahmaputra

Prelims: Environmental ecology.

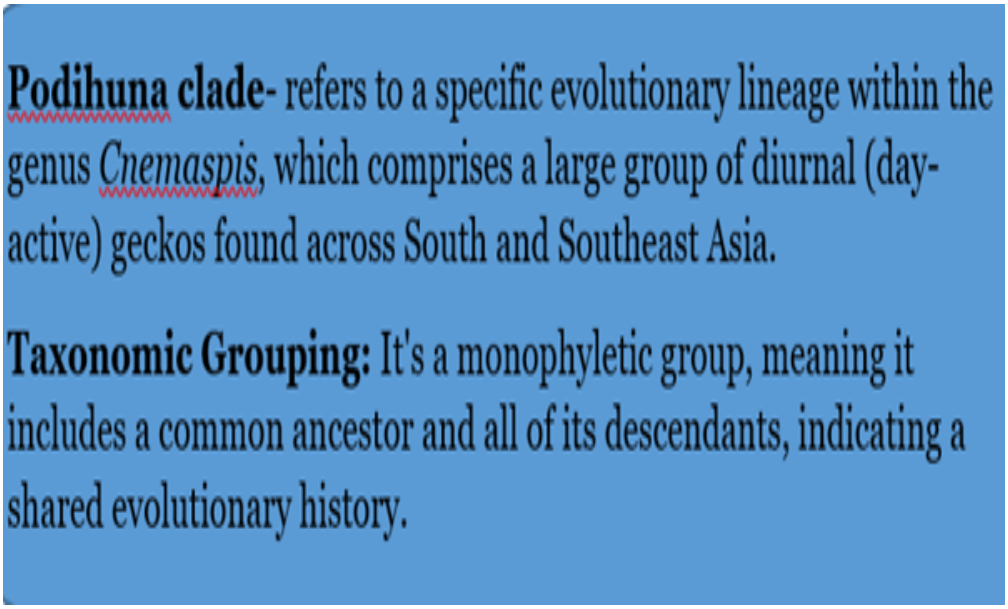
Mains: Conservation

Why in news?

A new species of gecko, *Cnemaspis brahmaputra*, has recently been discovered in Assam, highlighting the rich biodiversity of Northeast India.

About *Cnemaspis brahmaputra*:

- **Named in** - Honor of the Brahmaputra River
- **Location -** Discovered near the Dirgheswari Temple on the bank of Brahmaputra River in Guwahati, Assam.
- **Published by** - *Taprobanica, the Journal of Asian Biodiversity.*
- **Genus and Family** - It belongs to the genus *Cnemaspis*, which is widely distributed across South and Southeast Asia.
    - It falls within the *podihuna* clade, a grouping predominantly found in Sri Lanka.
    - *Cnemaspis brahmaputra* is only the 2nd representative of this clade on the Indian mainland, the other being *Cnemaspis assamensis.*



- **Morphological Features** - Unlike most geckos in Northeast India which are nocturnal, *Cnemaspis brahmaputra* is **diurnal** (active during day).
- **Distinguished from its close relatives by** -

    - A larger body size (30.8–35.7 mm).
    - Fewer midbody scale rows.
    - A higher number of ventral scales (enlarged scales on the underside).
    - Absence of tubercles (small rounded projections) on lower flanks.
    - 3 enlarged rows of thigh scales parallel to the enlarged femoral scale row.
- **Geographical Importance**- The discovery near the Brahmaputra River underscores the critical role of major rivers as:
    - **Geographic barriers** - Isolating populations and leading to speciation.
    - **Evolutionary engines** -Shaping the distribution and genetic diversity of species.
    - Its restricted range alongside the river enhances understanding of local endemism and biodiversity patterns in Assam.
- **Signifying rivers** - Environmental role as both a barrier and corridor for species evolution, and its symbolic connection to Assamese identity.
- **Cultural Importance**- Naming of the species pays tribute to the Brahmaputra River's deep importance in Assamese folklore, daily life, & regional pride.
- **Finding aims -** To boost local awareness about Assam's unique biodiversity and the urgent need for its conservation amidst ecological threats.
- **Significance** - Highlights Northeast India's status as a **biodiversity hotspot** and emphasizes the ongoing importance of scientific exploration in under-studied habitats to uncover new species and understand evolutionary processes.

Genetic Study of Indian Population

Prelim: Demographics

Mains: Salient features of Indian Society, Diversity of India

Why in News?

Old genetic study published recently continue to unveil the deep ancestral roots of Indian populations, offering insights into major human migrations and the historical impact on social structures like the caste system.

Punished by – in 2009 by Harvard, MIT (US) & Centre for Cellular and Molecular Biology (CCNB)
Report Titled - 'Reconstructing Indian Population History'

Findings.

- **"Out of Africa" Migration** - 50,000 years ago, all present-day humans trace their lineage back to a single major migration out of Africa forming the foundational genetic component for populations worldwide, including India.
- **Major Ancestral Indian Populations** - 2009 study identified 2 primary, genetically divergent ancestral populations that contributed to most modern Indians:
    - **Ancestral North Indians (ANI)** - Genetically similar to populations from West Asia, Central Asia, and Europe.

- **Higher ANI ancestry** -Predominant in northern Indian states. "Upper caste" groups across India show a significant proportion (39-71%) of ANI ancestry.
- **Ancestral South Indians (ASI) -** Based on a deeper study of ancient genetic information from over 500 individuals in Central Asia and Northern South Asia.
- It's been concluded that ASI are genetically distinct from the ANI, originating from East Eurasia, and that modern tribal groups in South India are considered their direct descendants.
- **Admixture** - These ANI & ASI populations are believed to have largely mixed over 3,000-4,000 years ago, forming the complex genetic mosaic seen across India today as Dravidians & Aryans.

- **Ancient Ancestral South Indians (AASI)** - Older than the ASI.

- Adivasi's of Andaman-Nicobar Islands are considered the "true ASIs" or AASI, having migrated from the East Asian-Pacific regions over 60,000 years ago.
- They largely remained socially and genetically isolated from mainland Indians.

- **Genetic Stratification** - Researchers in 2003 used 'haplogroups' (genetic markers of common parenting), indicates correlation with the caste system:
  - Certain ancestral genetic components are highest in tribal groups.
  - These components are somewhat less common in "lower castes."
  - They are least common in "upper castes."

Social barriers – Are slowly eroding with increasing education, democracy & modernization.

- **Inter-caste marriages** & **Inter-faith marriages** - Rose to 6% & 1% respectively by 2011 Census.
- **Future Outlook** - These numbers are expected to have risen significantly, in urban areas, reflecting increased social mobility and integration, with clearer data anticipated from the forthcoming 2027 Census.

Reference [The Hindu| The peopling of the Indian subcontinent]

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