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Complex Greenhouse Gas dynamics in the Central Himalayas

Prelims - *Current events of National & International importance and General issues on Environmental ecology, Biodiversity & climate change*

Why in News?

Recently, scientists revealed the data on Greenhouse Gas (GHG) emissions around the Himalayan region.

- **Data gathered by** - Aryabhatta Research Institute of Observational Sciences (ARIES), an autonomous research institute under the Department of Science & Technology (DST).
- **Data collection site -** High-altitude research site in Nainital for over 5 years.
- **Key findings -** Greenhouse gas concentrations in the Central Himalayas are generally higher than those at other remote background sites.
- However, these levels remain lower than those typically found in urban and semi-urban settings.
- **Contributing Factors -** Natural processes and human activities together shape greenhouse gases.
- **Key Green-house gases** - Carbon dioxide (CO_2) and methane (CH_4), and carbon monoxide (CO) in the Central Himalayan region.
- **Daily Variations -** Carbon dioxide reaches its lowest levels during daylight hours due to active photosynthesis.
- Methane and carbon monoxide tend to peak during the day as mountain winds transport pollutants upward from lower elevations.
- **Seasonal Variations -** Carbon dioxide concentrations rise in spring, coinciding with increased biomass burning and limited vegetation cover.
- Methane levels are highest in autumn, likely linked to agricultural activities such as rice cultivation.
- Carbon monoxide peaks in late spring, suggesting a strong influence from regional pollution transport during this period.
- **Long-term trends** – The trends point to a steady rise in both carbon dioxide (2.66 ppm per year) and methane (9.53 ppb per year).
- These trends are even higher than those at ***Mauna Loa (a background site),*** underscoring the growing impact of anthropogenic emissions in the region.
- In contrast, carbon monoxide shows a gradual decline (3.15 ppb per year), possibly reflecting improvements in combustion efficiency or changes in regional emission sources.

- **Significance -** These comprehensive, high-resolution observations provide an essential baseline for validating satellite data, refining emissions inventories and improving atmospheric models.
- To disentangle the effects of biospheric uptake, regional emissions, and complex meteorological patterns that shape the region's air quality and climate.

Reference

PIB| Complex Greenhouse Gas dynamics in the Central Himalayas

Grandala Bird

Prelims - *Current events of National & International importance | General issues on Environmental ecology, Bio-diversity & climate change.*

Why in News?

Recently, a rare 'Grandala' Electric-Blue Bird was spotted in Sainj Valley, Himachal Pradesh.

- Grandala is the only species within the genus Grandala.
- **Scientific name** - Grandala coelicolor.
- **Family –** Turdidae.
- **Size -** Medium-sized, measuring approximately 25-27 cm in length and weighing between 38-52 grams.
- **Plumage -** Males are a deep blue with black wings, while females are brownish with white stripes and a grey-blue rump.
- **Distinctive Features -** Males have a black throat patch. In flight, a white patch on the wing covers is visible.
- It has a clear sexual dichromatism or easy distinction between male and female birds.
- **Behaviour -** They are social and always seen in flocks.

  The sight of a flock of Grandalas in flight has been described as a "hypnotic effect" and compared to a tree "suddenly in bloom" when they alight on bare branches.

- **Habitat -** They prefer alpine and subalpine regions, including rocky outcrops, scrublands, and alpine meadows at elevations typically between 3,000 to 5,000 meters.
- They also inhabit fruit orchards and descend to lower elevations during winter.
- **Distribution -** Found primarily in the low to mid-altitudes of the Himalayas, including areas within India (Kashmir to Arunachal Pradesh), Nepal, Bhutan, Myanmar, Tibet, and other parts of China.
- **Primary Diet -** Grandalas are arboreal insectivores, feeding on various insects, larvae,

nymphs, caterpillars, moths, and seeds.

- **Breeding -** Building nests on cliff faces with materials like sticks, moss, and feathers.
- **Conservation status - IUCN** - Least Concern.

Reference

1. TIMESNOW| Rare Grandala species spotted in the Himalayas
2. TOI| Meet the electric blue bird of the Himalayas

India's first Tribal Genome Project

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

Why in News?

Gujarat has become the first Indian State to launch a genome sequencing initiative focused exclusively on tribal communities.

- **Aim -** To improve healthcare for tribal communities by creating a dedicated genomic database.
- **Title -** "Creation of Reference Genome Database for Tribal Population in Gujarat".
- It is to sequence the genomes of 2,000 people belonging to tribal communities across

17 districts in the State.

- **Implementation agency -** Gujarat Biotechnology Research Centre (GBRC).
- **Funding -** Part of the 2025–26 State budget.
- **Detecting genetic disorders -** The initiative will focus on early detection and targeted treatment of genetic disorders such as sickle cell anaemia, thalassaemia, and certain hereditary cancers.
- **Facilitate personalized medicine -** By understanding the specific genetic variations within these communities, the project aims to enable early diagnosis and targeted treatment of diseases.
- **Bridge the gap between traditional knowledge and modern science** - The initiative seeks to integrate traditional knowledge with advancements in genomic research to improve tribal health.
- **Create a reference genome database -** The project will build a comprehensive repository of genetic markers and data specific to India's diverse tribal populations, which can be used for future research and public health planning.

Reference

The Hindu| India’s first Tribal Genome Project

WHO's Policy Shift Against Tabacco Harm Reduction

Prelims: *Current Events of National and International Importance*

Why in News?

WHO’s recent shift opposes tobacco harm reduction, deviating from earlier endorsements of safer alternatives, not only contradicts decades of evidence but ‘disproportionately harms countries like India.

- **Earlier framework -** The World Health Organization (WHO) had previously balanced *prevention, cessation, and harm reduction*, recognizing benefits from alternatives like e-cigarettes.
- **Present WHO recommendation** - The WHO now strongly prioritizes a "*cessation-only" approach,* urging that people quit all forms of tobacco and nicotine use rather than transition to safer alternatives.
- **CAPHRA Objection -** The Coalition of Asia Pacific Tobacco Harm Reduction Advocates (CAPHRA) flags the significant risks, especially in the Indian context.

CHAPRA
• It is an alliance between the Tobacco Harm Reduction Advocates and their respective organizations in the Asia Pacific Region. • **Aim** – To educate, advocate and represent the right of adult alternative nicotine consumers to access and use of products that reduce harm from tobacco use.

- CHAPRA recently released a “white paper” noting that *Nicotine is not what causes cancer or heart disease.* It’s the ***toxic smoke from burning tobacco that kills.***
- **Disproportionate impact -** CAPHRA argues that a prohibitionist approach will disproportionately harm countries like India, with high smoking rates and diverse tobacco use.
- **E-cigarettes and other ENDS -** WHO's stance on electronic nicotine delivery systems (ENDS) is a major point of contention.
- While some studies suggest they are less harmful than smoking, WHO remains cautious and concerned about their potential risks.
- **Gateway effect -** The concern that e-cigarettes may lead to smoking remains a significant factor in the WHO's approach.
- **Industry influence -** Some critics suggest that the tobacco industry has exploited the concept of harm reduction to promote its products.

Concerns

- **Usage diversity -** Over 200 million use smokeless tobacco, and millions smoke bidis; informal networks dominate the market.
- **Economic lifeline -** The tobacco sector maintains around 45 million jobs, many belonging to farmers, small businesses, and rural women.
- **Vulnerable Groups -** The policy shift risks harming the most economically and socially vulnerable populations.

Reference

The Hindu| WHO’s Policy Shift Against Tobacco Harm Reduction