DAILY CURRENT AFFAIRS 20-08-2024

GS-1

1. **Aravali ranges**
2. **IMD forecast**

GS-2

3. **Ensuring social justice in the bureaucracy**

GS-3

4. **National Pest Surveillance System (NPSS)**
5. **Californium**

Aravali ranges

Syllabus: GS-1; Indian Geography

Context

- *Haryana has tagged 24,353 hectares of Aravali land in five of its districts - Gurgaon, Nuh, Rewari, Mahendergarh and Charkhi Dadri - as protected forest, under the* **compensatory afforestation swap** *meant to make up for the destruction of tropical rainforests in Great Nicobar.*

About

- *The Aravali Ranges are one of the oldest mountain ranges in the world, with geological formations dating back to the* **Proterozoic era.**
- *They stretch approximately 692 kilometers across the northwestern part of India, primarily through the states of Rajasthan, Haryana, and Gujarat, and end near Delhi.*

Geological Significance

- **Age:** *The Aravali Ranges are estimated to be around 3.5 billion years old, making them among the oldest mountain systems globally.*
- **Formation***: They were formed as a result of the collision between the Indian Plate and the Eurasian Plate during the Precambrian era.*

- **Composition:** *The Aravalis are primarily composed of ancient crystalline, metamorphic, and sedimentary rocks, including schists, gneisses, and quartzites.*

Geographical Extent

- **Starting Point:** *The Aravali Ranges begin near the city of Delhi, extending southwestward across Haryana and Rajasthan.*
- **Highest Peak:** *Guru Shikhar is the highest peak in the Aravali Range, located in the Sirohi district of Rajasthan, with an elevation of about 1,722 meters.*
- **Notable Ranges:** *The Aravalis include several notable sub-ranges such as the Mewat Hills, the Sambhar Sirohi Range, and the Ajmer Hills.*

Ecological Importance

- **Biodiversity:** *The Aravali Ranges host a variety of flora and fauna. The forests here are mainly tropical dry deciduous and thorny, with species like the dhak (Butea monosperma), salai, and khair.*
- **Watershed Role:** *The Aravalis act as a critical watershed, influencing the climate and hydrology of the regions they traverse. They separate the fertile plains of northern India from the arid Thar Desert, acting as a barrier to desertification.*
- **National Parks:** *The range is home to several protected areas, including the Sariska Tiger Reserve and the Ranthambore National Park.*

Environmental Challenges

- **Deforestation:** *Over the years, large parts of the Aravali forests have been cleared due to mining activities, urbanization, and illegal encroachments, leading to significant ecological degradation.*
- **Mining:** *Unregulated mining for minerals such as marble, granite, and other construction materials has caused extensive damage to the range, leading to soil erosion and loss of biodiversity.*
- **Climate Change***: The degradation of the Aravalis has made the region more susceptible to the adverse impacts of climate change, including increased frequency of droughts and a rise in desertification in surrounding areas.*

IMD forecast

Syllabus: GS-1; Geography

Context

1) *IMD rain forecasts for Mumbai wrong by 42% in July 2024.*
2) *The Indian Meteorological Department has issued an orange alert for many states with likely light rainfall in the national capital. Rajasthan, which witnessed heavy rains will get relief, according to the weather department.*

About

- *The India Meteorological Department (IMD) was established in 1875 and functions under the Ministry of Earth Sciences.*
- *Its primary role is to provide weather and climate-related information and forecasts for various sectors, including agriculture, aviation, shipping, and disaster management.*

Main Functions

- **Weather Forecasting:** *IMD provides short-term, medium-term, and long-term weather forecasts. This includes daily weather predictions, monsoon forecasts, and seasonal climate outlooks.*
- **Cyclone Warning:** *IMD plays a critical role in cyclone tracking and issuing early warnings to mitigate the impact on coastal regions.*
- **Seismology***: It also monitors and provides information related to seismic activity.*
- **Public Awareness:** *The IMD conducts various programs to educate the public about weather phenomena, climate change, and disaster preparedness.*

Forecasting Techniques

- **Observation Systems:** *IMD utilizes a network of surface observatories, weather radars, automatic weather stations, and satellite data to monitor atmospheric conditions.*
- **Numerical Weather Prediction (NWP):** *IMD uses sophisticated models to simulate the atmosphere and predict future weather patterns. These models are essential for accurate short-term and long-term forecasts.*
- **Seasonal Forecasting:** *The IMD issues seasonal forecasts, such as the monsoon forecast, which is crucial for agriculture.*
  These forecasts are based on statistical models, climate models, and the analysis of global atmospheric and oceanic conditions.

IMD Monsoon Forecast

- **Importance of Monsoon:** *The Southwest Monsoon is crucial for India as it accounts for about 70-80% of the annual rainfall, impacting agriculture, water resources, and the economy.*
- **Forecasting Process:** *The IMD uses a combination of dynamic models and statistical techniques to predict the onset, progression, and withdrawal of the monsoon. It also provides updates on the spatial and temporal distribution of rainfall.*
- **Impact on Agriculture:** *The monsoon forecast is critical for planning agricultural activities. Farmers rely on IMD's forecast for deciding the timing of sowing, irrigation, and harvesting.*

Challenges in Forecasting

- **Climate Change:** *Changing climate patterns pose a challenge to traditional forecasting models, necessitating constant updates and the development of more sophisticated models.*
- **Accuracy Issues***: Despite advances in technology, weather forecasting remains complex, and inaccuracies can have significant impacts, particularly in disaster-prone regions.*
- **Communication***: Ensuring that weather forecasts and warnings reach the public and are understood and acted upon effectively is a continuing challenge.*

Recent Developments and Initiatives

- **Upgradation of Forecasting Models:** *IMD has been upgrading its forecasting capabilities with the introduction of more advanced models and greater use of artificial intelligence (AI) and machine learning (ML).*
- **Improvement in Cyclone Prediction***: In recent years, IMD has improved its cyclone prediction capabilities, reducing the error margin significantly.*
- **Monsoon Mission***: Launched by the Ministry of Earth Sciences, the Monsoon Mission aims to improve seasonal and intra-seasonal forecasts of the monsoon using advanced climate models.*
- **Collaboration with International Agencies:** *IMD collaborates with global meteorological organizations to share data and improve forecasting accuracy.*

Ensuring social justice in the bureaucracy

Syllabus: GS-2; Governance

Context

- *The Article discuues about Ensuring social justice in the bureaucracy with the solution of having a fixed tenure, irrespective of age of entry*

What is Social Justice?

- *Social justice in the bureaucracy ensures* **equitable treatment and opportunities for all sections of society, particularly the marginalized and underrepresented groups.**
- *It addresses disparities based on caste, gender, religion, and economic status within the administrative system.*

Historical Context

- **British Era:** *The bureaucracy was structured to serve colonial interests, largely ignoring the principles of social justice.*
- **Post-Independence:** *Efforts were made to democratize the bureaucracy and ensure representation from diverse social backgrounds.*

Constitutional Mandate

- **Articles 15 and 16:** *Prohibit discrimination and ensure equality of opportunity in public employment.*
- **Article 335:** *Balances the claims of SCs, STs, and other weaker sections with the maintenance of efficiency in administration.*
- **Reservation Policy:** *Provides for the reservation of jobs in government services for SCs, STs, OBCs, and economically weaker sections.*

Challenges in Ensuring Social Justice

- **Underrepresentation:** *Marginalized communities are still underrepresented in higher levels of bureaucracy.*
- **Bias and Discrimination***: Prejudices and biases based on caste, gender, and religion persist within the system.*
- **Economic Barriers:** *Candidates from economically weaker sections face difficulties in accessing quality education and coaching for competitive exams.*
- **Promotion Policies:** *Issues in promotion policies that sometimes do not fully account for social justice.*

Recent Measures and Reforms

- **Lateral Entry:** *Introduced to bring in talent from diverse backgrounds, including private sector professionals, into bureaucracy.*

- **Training Programs:** *Sensitization and capacity-building programs for civil servants to instill values of social justice.*
- **Digital Initiatives:** *Use of technology to ensure transparency and reduce corruption, which disproportionately affects marginalized groups.*
- **Quota in Promotions:** *Introduction of reservation in promotions for SCs and STs to address their underrepresentation in higher echelons.*

Role of Judiciary

- **Landmark Judgments:** *The Supreme Court has played a crucial role in interpreting and upholding the principles of social justice in various rulings.*
- **Indra Sawhney Case (1992):** *Affirmed the importance of reservation but capped it at 50% and introduced the concept of the 'creamy layer' in OBC reservations.*

Impact of Social Justice in Bureaucracy

- **Increased Representation:** *Reservation policies have led to better representation of marginalized groups in the bureaucracy.*
- **Better Policy Formulation:** *A diverse bureaucracy is more likely to formulate inclusive policies that cater to the needs of all sections of society.*
- **Social Harmony:** *Ensuring social justice in bureaucracy contributes to social harmony by reducing inequalities and promoting inclusivity.*

Way Forward

- **Holistic Education and Training:** *Improve access to quality education and training for underprivileged sections to ensure their better representation in bureaucracy.*
- **Merit-Based Reservations:** *Ensure that reservation policies are merit-based and do not compromise the efficiency of the administration.*
- **Continued Reforms***: Regular review and reform of policies to address emerging challenges and ensure that the bureaucracy remains a tool for social justice.*

National Pest Surveillance System (NPSS)

Syllabus: GS-3; Agriculture, GS-2; Government policies and Interventions

Context

- *Recently, Union Agriculture and Farmers Welfare Minister Shivraj Singh Chauhan inaugurated the National Pest Surveillance System (NPSS) in New Delhi.*

More to know

- *The National Pest Surveillance System (NPSS) is a critical initiative in India aimed at strengthening the country's agricultural pest management infrastructure.*
- *It plays a vital role in* **monitoring and managing pest populations to safeguard crop production and ensure food security.**

Objective

- *The NPSS aims to establish a comprehensive and* **real-time pest surveillance mechanism across the country.**
- *It seeks to detect pest outbreaks early, allowing for timely intervention and minimizing crop damage.*

Components

- **Real-time Monitoring:** *The system is designed to provide continuous and real-time data on pest populations and their movements across different regions.*
- **Data Collection and Analysis:** *Advanced tools and technologies, including remote sensing, Geographic Information Systems (GIS), and mobile apps, are used to collect and analyze data on pest incidence and spread.*
- **Forecasting and Alerts:** *NPSS generates early warnings and forecasts based on the collected data, helping farmers and agricultural authorities to prepare and respond to potential pest threats effectively.*

Implementation

- **Centralized Coordination:** *The system is coordinated by central and state-level agricultural agencies, ensuring a streamlined flow of information and resources.*
- **Field Units:** *It includes field units that regularly survey and report on pest activity, which is then fed into the central database.*
- **Collaboration with Farmers:** *Farmers are encouraged to participate in the surveillance process by reporting pest occurrences via mobile apps or local agricultural offices.*

Benefits

- **Prevention of Crop Losses***: By providing timely alerts, the NPSS helps in reducing crop losses due to pest attacks, which is crucial for maintaining agricultural productivity.*
- **Resource Optimization:** *The system helps in optimizing the use of pesticides and other control measures by targeting only the affected areas, thereby reducing environmental impact and costs.*
- **Policy Making:** *The data generated by NPSS supports evidence-based decision-making and policy formulation in agricultural pest management.*

Challenges

- **Data Accuracy:** *Ensuring the accuracy and reliability of data collected from diverse sources is a significant challenge.*

- **Farmer Awareness and Participation:** *Effective implementation depends on the active participation of farmers, which requires raising awareness and providing adequate training.*
- **Infrastructure and Technological Integration:** *Establishing a robust infrastructure and integrating advanced technologies across all regions, including remote areas, is a complex task.*

Californium

Syllabus: GS-3; Science and Technology

Context

- *Recently, the police in* **Bihar's Gopalganj seized** *what they thought was a highly unusual and dangerous contraband:* **50 grams of the highly radioactive metal Californium, estimated to be worth Rs 850 crore.**

About

- *Californium is a* **synthetic, radioactive chemical element** *with the* **atomic number 98** *and the* **symbol Cf**.

- *It belongs to the actinide series of the periodic table and was first synthesized in 1950 at the University of California, Berkeley.*
- *Named after the state of California, it was discovered by bombarding* **curium-242** *with alpha particles (helium nuclei).*

Properties:

- **Physical Properties:** *Californium is a silvery-white metal, and it exists in two crystalline forms. It is malleable and easily oxidizes when exposed to air.*
- **Radioactive Properties:** *Californium is highly radioactive, with several isotopes, among which Californium-252 is the most notable.*
  This isotope emits neutrons, which makes it useful in various industrial and scientific applications.
- **Half-Life:** *Californium-252 has a half-life of about 2.645 years.*

Applications

- **Neutron Source:** *Californium-252 is a powerful neutron emitter, making it invaluable in neutron activation analysis, a technique used to detect trace amounts of elements in samples.*
- **Nuclear Reactor Start-up***: It is used as a neutron source to start up nuclear reactors.*
- **Medical Applications***: Californium-252 is utilized in cancer treatment, particularly in neutron therapy for certain types of cancer that are resistant to other forms of radiation therapy.*
- **Oil Exploration:** *It is used in neutron moisture gauges and in the petroleum industry to identify layers of oil and water in wells.*
- **Security and Defense***: Its ability to detect explosives and other materials through neutron radiography is valuable in security applications.*

Production and Handling

- **Production:** *Californium is produced in nuclear reactors by bombarding plutonium or curium with neutrons.*
  Due to its scarcity and the complexity of its production, californium is extremely expensive.
- **Handling:** *Because it is highly radioactive, californium must be handled with great care, using specialized equipment to protect against radiation exposure.*
- **Health and Safety***: Californium's intense radioactivity poses significant health risks. Exposure to its radiation can cause serious damage to living tissues, leading to radiation burns, cancer, or death.*
  Strict safety protocols are required when handling or transporting this element.

Environmental Impact

- *Due to its radioactive nature, californium can pose long-term environmental hazards if not managed properly.*
- *Its disposal is a major concern, necessitating secure containment to prevent environmental contamination.*