DAILY CURRENT AFFAIRS 02-09-2024

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Artificial Rain

Syllabus: GS-1; Physical Geography, GS-3; Environmental Concern

Context

- **Artificial rain, behavioural changes, voluntary limits on private vehicles, tweaking office hours, and promoting work from home:** *These are some of the suggestions from experts that the Delhi government will be deliberating on as it formulates this year's* **Winter Action Plan** *aimed at combating air pollution that the season has become notorious for in the Capital.*

About

- *Artificial rain, commonly referred to as* **cloud seeding,** *is a weather modification technique that aims to enhance precipitation from clouds.*
- *This process involves dispersing substances into the air that act as cloud condensation or ice nuclei, thereby stimulating cloud formation and increasing rainfall.*
- *Cloud seeding is typically used in areas facing water scarcity, drought conditions, or for managing snowfall.*

History and Development

- **Early Experiments:** *The concept of cloud seeding dates back to the 1940s when American chemist Vincent Schaefer, working for General Electric, discovered that dry ice (solid carbon dioxide) could induce ice crystal formation in supercooled clouds.*
  This was followed by research by scientists like Bernard Vonnegut, who discovered that silver iodide could also be used for cloud seeding.
- **Global Adoption:** *Various countries, including the United States, China, Russia, and India, have adopted cloud seeding programs to combat drought, manage water resources, and mitigate hailstorms.*

Techniques of Cloud Seeding

- **Hygroscopic Seeding:** *This involves dispersing salts such as sodium chloride or calcium chloride into the clouds.*
  These salts attract water vapor, leading to the formation of larger water droplets that can fall as rain.
- **Glaciogenic Seeding:** *In this technique, substances like silver iodide or dry ice are dispersed into supercooled clouds (clouds with temperatures below freezing). These substances encourage the formation of ice crystals, which grow in size and eventually fall as snow or rain.*

Methods of Dispersal

- **Aircraft:** *Fixed-wing aircraft or helicopters are used to release seeding agents directly into clouds.*
- **Ground-based Generators:** *Ground-based burners or flares release seeding agents that are carried into the atmosphere by air currents.*
- **Rocket Launchers:** *Rockets are sometimes used to disperse seeding materials at higher altitudes.*

Applications of Artificial Rain

- **Drought Mitigation:** *Cloud seeding is used in drought-affected regions to enhance rainfall and replenish water reservoirs, thus aiding agriculture and water supply.*
- **Agricultural Benefits:** *By increasing rainfall in targeted areas, cloud seeding can help improve crop yields and prevent crop failure during periods of insufficient natural rainfall.*
- **Water Resource Management:** *In regions with limited water resources, cloud seeding can help manage water supply by increasing rainfall in catchment areas.*
- **Hail Suppression:** *Cloud seeding can be used to prevent or reduce the formation of hailstones in thunderstorms, protecting crops and property.*
- **Snowfall Enhancement:** *In mountainous regions, cloud seeding is used to increase snowfall, which is crucial for maintaining winter tourism and ensuring a steady water supply from snowmelt.*

Challenges and Controversies

- **Effectiveness:** *The effectiveness of cloud seeding is still a matter of debate among scientists.*
  While some studies suggest a positive impact on rainfall, others argue that natural factors, not cloud seeding, are responsible for the observed increases.
- **Environmental Concerns:** *The long-term environmental impact of dispersing chemicals like silver iodide into the atmosphere is not fully understood.*
  Concerns include potential soil and water contamination.
- **Ethical Issues:** *Cloud seeding can raise ethical concerns, especially when used in one region at the expense of another.*
  For example, inducing rainfall in one area might reduce rainfall in another, leading to disputes.
- **Cost:** *Cloud seeding is an expensive process that requires significant investment in technology, infrastructure, and research.*
  The high costs may not always justify the benefits, particularly in developing countries.

India's Cloud Seeding Initiatives

- **State-Level Projects**: *Several Indian states, including Maharashtra, Karnataka, Andhra Pradesh, and Tamil Nadu, have undertaken cloud seeding projects to combat drought and enhance agricultural productivity.*
- **National Efforts:** *The Indian government has considered cloud seeding as a potential solution to address the challenges posed by erratic monsoons.*
  However, large-scale implementation has been limited due to concerns over effectiveness and cost.
- **Recent Projects:** *Notable cloud seeding efforts include the 'Project Varshadhari' in Karnataka, which aimed to increase rainfall in drought-prone districts.*

Reforming the process of judicial appointments

Syllabus: GS-2: Indian Judiciary

Context:

- **Pending Cases**: *As of April, 60 lakh cases pending in various High Courts.*
- **Vacancy in Judiciary**: *30% of judicial seats remain vacant (Department of Justice report).*

Issues with Judicial Appointments

- **Debate on Appointment Mechanism**: *Appointment of judges linked to case pendency and executive-judiciary standoff.*
- **Supreme Court Verdict**: *NJAC Act (2014) and 99th Constitution Amendment struck down as unconstitutional, affirming the collegium system for judicial appointments.*
- **Collegium System**: *Criticized for:*
  - *Lack of accountability and transparency.*
  - *Nepotism in appointments.*

National Judicial Appointments Commission (NJAC)

- **Proposed Structure**: *Intended to replace the collegium system; included:*
  - *Chief Justice of India.*
  - *Law Minister.*
  - *Two eminent persons.*

- *Two senior judges.*

- **Judiciary's Concerns***:*
  - *NJAC could lead to excessive government control over appointments.*
  - *Risk of compromising judicial independence and impartiality.*
- **Support for NJAC***: Advocated by legal professionals who argue it could expedite appointments.*

Lessons from Other Countries

- **International Practices***:*
  - **United Kingdom***: Judicial Appointments Commission established by the Constitutional Reform Act (2005); includes diverse members from legal and lay backgrounds.*
  - **South Africa***: Judicial Service Commission (JSC) advises the President on judicial appointments, composed of legal professionals and representatives from government.*
  - **France***: Judges selected through the High Council of the Judiciary or the Minister of Justice, safeguarding judicial independence without direct presidential selection.*
- **Relevance for India***: Learning from these progressive appointment systems could improve India's judicial appointment process.*

Reworking NJAC

- **Potential for Reform***: NJAC seen as a democratic structure that could enable faster nominations.*
- **Collegium System Limitations***:*
  - *Opaque process; criteria for selections are unclear.*
  - *Opportunity for favoritism, hindering merit-based appointments.*
- **Need for Balance***:*
  - *NJAC could be refined to incorporate views of judiciary, executive, and civil society.*
  - *Aim to strike a balance between judicial independence and accountability.*
- **Path Forward***:*

- *Establish an efficient judicial appointment system.*
- *Foster communication among state arms.*
- *Enhance public confidence in the judiciary.*
- *Address the pressing issue of delayed justice in India.*

Will an extended space stay affect astronauts?

Syllabus: GS-3: Science and Technology – Space.

Context:

- *On August 24, NASA reported that Boeing's Starliner crew capsule, which took astronauts* **Sunita Williams and Barry Wilmore to the International Space Station** *(ISS) during its first crewed test flight, was deemed unsafe for their return journey.*
- *NASA extended Williams's and Wilmore's stay on the ISS until February 2025. They will return in a SpaceX crew capsule to be launched in September 2024.*
- *Boeing's Starliner will undock and return uncrewed.*

Definition of Space

- **Space Boundary***:*
  - *Space is typically considered to begin at the Karman line, 100 km above sea level.*
  - *The transition from earth-like conditions to space-like conditions is gradual.*
  - **Microgravity***: Astronauts onboard the ISS experience microgravity, not zero gravity.*
- **Van Allen Radiation Belts***:*
  - *Located above the Karman line, from 640 km to 58,000 km up.*
  - *Comprised of charged particles trapped in the Earth's magnetic field.*
  - *These belts expose astronauts to radiation, though not at harmful levels, as studied during the U.S. Apollo programme.*

Effects of Space on the Human Body

- **Bone and Kidney Health***:*
    - *In microgravity, bones weaken, leading to potential deposition of excess minerals in the kidneys, which may cause renal stones.*
- **Digestive System***:*
    - *Slower movement of food through the gut can result in weight gain.*
- **Spaceflight-Associated Neuro-Ocular Syndrome (SANS)***:*
    - *20% of all astronauts, and 70% of those on long-duration spaceflights, develop SANS.*
    - *This condition involves fluid buildup at the back of the eye, affecting eyesight.*
- **Cardiovascular and Muscular Systems***:*
    - *The heart may shrink due to reduced workload in a weightless environment.*
    - *Muscle mass and strength may decrease.*
- **Blood and Brain Function***:*
    - *Increased loss of red blood cells compared to Earth, requiring dietary adjustments.*
    - *The brain works harder to maintain balance and orientation in space due to altered signals from the body.*
- **Causes of These Effects***:*
    - *Radiation exposure.*
    - *Confined and hostile environments.*
    - *Distance from Earth.*
    - *Microgravity.*
- **Psychological Effects***:*
    - *Factors such as fatigue, loss of morale, and a sense of helplessness due to distance from Earth.*

Countering Space's Effects on the Human Body

- **Exercise and Routines**:
  - *Strict exercise regimes and predictable routines are enforced to minimize stress and maintain physical health.*
- **Nutritional Adjustments**:
  - *Researchers are studying the metabolism of nutrients and drugs in space to adjust astronauts' diets.*
- **Technological Interventions**:
  - *Development of portable optical coherence tomography machines to monitor SANS.*
  - *Exploring countermeasures like lower body negative pressure, artificial gravity, and drugs to reduce intracranial pressure.*
- **Ongoing Research**:
  - *Space omics studies are key to understanding the biological impact of space, with notable research including NASA's Twins Study and international collaborations like Japan's KAKENHI programme and Europe's Space Omics Topical Team.*

Duration of Human Presence in Space

- **Historical Context**:
  - *The average maximum time in space has increased from one month in the 1960s to six months in the 2020s.*
- **Current Records**:
  - *Valeri Polyakov holds the record for the longest single mission (437 days).*
  - *Frank Rubio holds the American record (370 days).*
  - *Oleg Kononenko is the only astronaut to have spent over 1,000 days in space across missions.*
- **Future Missions**:
  - *Long-duration missions to the Moon and Mars are planned, posing new safety challenges for space agencies globally.*

Anti dumping duty

Syllabus: GS-3; Economy

Context

- **India's trade ministry has recommended imposing an anti-dumping duty on aluminium foil imported from China** *after surging shipments from the neighbouring country captured nearly a third of India's market share despite ample local production capacity.*

About

- *Anti-Dumping Duty is a* **protectionist tariff** *that a* **domestic government imposes on foreign imports that it believes are priced below fair market value.**
- *The objective is to safeguard the domestic industry from unfair competition and to ensure a level playing field.*

Purpose

- **Protect Domestic Industry:** *Anti-dumping duties are intended to protect local manufacturers from the damage caused by the dumping of cheap goods from foreign producers.*
- **Prevent Unfair Trade Practices:** *It aims to curb unfair trade practices by foreign exporters who sell products at below-cost prices to gain market share in a foreign country.*

Key Concepts

- **Dumping***: Occurs when a foreign company exports a product to another country at a price lower than the price it normally charges in its own home market.*
- **Fair Market Value:** *The normal price of a product in the exporter's domestic market.*
- **Material Injury:** *Harm caused to the domestic industry by dumping. It includes loss of market share, reduction in sales, decline in production, lower profits, and job losses.*

Legal Framework

- **World Trade Organization (WTO):** *The WTO allows member countries to impose anti-dumping duties under certain conditions.*
  The duties should be in compliance with the Agreement on Implementation of Article VI of the General Agreement on Tariffs and Trade 1994 (commonly known as the Anti-Dumping Agreement).
- **Indian Legislation:** *In India, anti-dumping measures are governed by the Customs Tariff Act, 1975 (Section 9A) and the Customs Tariff (Identification, Assessment and Collection of Anti-Dumping Duty on Dumped Articles and for Determination of Injury) Rules, 1995.*

Controversies and Criticism

- **Protectionism:** *Critics argue that anti-dumping duties are often used as a tool for protectionism, shielding inefficient domestic industries from competition.*
- **Retaliation***: It can lead to trade disputes and retaliation from the exporting country, potentially escalating into a trade war.*
- **Impact on Consumers:** *Higher prices due to duties can adversely affect consumers in the importing country.*

Aluminium foil

Properties of Aluminium Foil

- **Lightweight:** *It has a low density, making it easy to handle and transport.*
- **Ductility:** *It can be easily molded or shaped without breaking.*
- **Barrier Properties:** *It acts as an excellent barrier to light, oxygen, moisture, and bacteria, which preserves the freshness of food.*
- **Thermal Conductivity:** *It has high thermal conductivity, making it ideal for heat retention and distribution.*
- **Non-toxic and Safe:** *It is non-toxic, making it safe for use in food packaging.*

Applications:

- **Packaging:** *Widely used in food packaging, especially for perishable items like chocolates, dairy products, and ready-to-eat meals.*
- **Household Uses:** *Commonly used in kitchens for cooking, baking, grilling, and storing food.*
- **Insulation***: Used in thermal insulation in buildings, electrical cables, and other applications.*
- **Pharmaceuticals:** *Used to pack medicines, especially tablets and capsules, due to its barrier properties.*
- **Industrial Uses:** *Used in capacitors, heat exchangers, and insulation for electrical cables.*

Agri Infra Fund

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

Context

- *Union Cabinet chaired by Prime Minister Narendra Modi approved the expansion of Agricultural Infrastructure Fund (AIF).*

Objectives

- *To enhance and* **strengthen the agricultural infrastructure** *in the country and support the farming community, the Government has announced a series of measures to expand the scope of Agricultural Infrastructure Fund (AIF) scheme.*

More to know

- **Viable Farming Assets***: To allow all eligible beneficiaries of scheme for creation of infrastructure covered under 'viable projects for building community farming assets'.*
- **Integrated Processing projects***: To include integrated primary secondary processing projects in list of eligible activities under AIF.*
- *However standalone secondary projects would not be eligible and would be covered under MoFPI schemes.*
- **PM KUSUM Component-A***: To allow convergence of Component-A of PM-KUSUM with AIF for farmer/group of farmers/ Farmer Producer Organizations/ Cooperatives/ Panchayats.*

  The alignment of these initiatives aims to promote sustainable clean energy solutions alongside the development of agricultural infrastructure.
- **NABSanrakshan:** *In addition to CGTMSE, it is proposed to extend AIF credit guarantee coverage of FPOs through the NABSanrakshan Trustee Company Pvt. Ltd. also.*

  This expansion of credit guarantee options is intended to enhance the financial security and creditworthiness of FPOs, thereby encouraging more investments in agricultural infrastructure projects.

Target Beneficiaries

The scheme is designed to benefit a broad range of stakeholders in the agricultural sector, including:

- **Individual Farmers***: Particularly those engaged in contract farming or who are members of FPOs.*
- **Farmer Producer Organizations (FPOs):** *For building infrastructure like storage facilities, processing units, etc.*
- **Agri-Entrepreneurs and Startups:** *Encourages innovation and entrepreneurship in the agri-sector.*
- **Primary Agricultural Credit Societies (PACS***): Helps in the modernization of PACS and enhances their role in providing agri-services.*
- **Marketing Cooperative Societies and Self-Help Groups (SHGs***): Supports the development of infrastructure that will facilitate better market access for farmers.*

Expected Outcomes

- **Reduction in Post-Harvest Losses***: By creating and improving storage and processing facilities, the fund aims to minimize wastage and spoilage of agricultural produce.*
- **Enhanced Farmer Income:** *By providing better storage and marketing facilities, farmers can sell their produce at more favorable prices, thus improving their overall income.*
- **Improvement in Agri-Infrastructure:** *The fund is expected to significantly enhance the overall infrastructure in rural areas, leading to more efficient farming practices and better market linkages.*