UPSC CURRENT AFFAIRS NOTES 19-01-2024

Senna spectabilis

Invasive species **Senna spectabilis** (**Calceolaria shower**) has been removed from over 356 hectares in Sathyamangalam Tiger Reserve.

Senna spectabilis

Common Names:

- Senna spectabilis is commonly known as **Cassia excelsa, Cassia fastigiata, or Cassia multijuga.** It is also referred to as "cassia" or "golden wonder tree."

Description:

- Senna spectabilis is a deciduous tree, reaching heights of 10 to 15 meters.
- Its compound leaves are pinnate, with several pairs of leaflets.
- During the flowering season, the tree produces vibrant clusters of yellow flowers, making it visually appealing.

Range

- America - Argentina, Paraguay, Brazil, Bolivia, Peru, Colombia, Venezuela.

Habitat

- Dryland forest in northeast Brazil, most commonly in open formations, favouring deep, well-drained, fertile soils.
- Moist and seasonally dry forests including pine and coastal forest, disturbed or secondary woodland and savannah.

Properties

Weed Potential	Yes
Conservation Status	Least Concern
Medicinal Rating	✚✚
Other Uses Rating	⚒⚒
Habit	Semi-deciduous Tree
Height	12.00 m
Growth Rate	Fast
Pollinators	Bees
Cultivation Status	Cultivated, Ornamental, Wild

Senna spectabilis an Invasive species

Ecological Impact:

- The extensive foliage impedes the growth of other indigenous tree and grass species.
- Hinders germination and growth of native species, posing a threat to biodiversity.

Uses

Edible Uses

- None known

Medicinal

- The plant has been used to treat ringworm and skin diseases.
- A leaf extract in alcohol has shown significant antifungal activity and suggests a potential use in infections caused by Candida albicans.
- Phytochemical studies isolated a new piperidine alkaloid (3-O-feruloylcassine and known spectaline and 3-O-acetylspectaline

- which showed moderate antioxidant activities and marginal COX-2 inhibition.
- A study showed aqueous extracts of the plant to be effective against food-borne pathogen **Cereus.**

Agroforestry Uses:

- The plant can be grown for shade and as a boundary market.
- Leaves can be used as mulch.

Other Uses

- The heartwood is brown; the sapwood is whitish. The wood is moderately heavy, soft to hard, slightly compact, moderately
- durable if kept dry and resistant to the attacks of termites. Because of its small dimensions, it is only used for small implements, tool handles, boxes etc.
- The wood is used for fuel and to make charcoal.

ASIAN BUDDHIST CONFERENCE FOR PEACE (ABCP)

Established in 1970 at Ulaanbaatar, Mongolia, as a voluntary movement uniting both monastic (monks) and lay Buddhist followers.

Background:

Rooted in Cold War Politics, initiated by Buddhist leaders from Mongolia, Buriat, the former Soviet Union, India, Sri Lanka, and Nepal.

Founded to promote peace, consolidate allies, and engage with the masses through peace movements and organizations.

Leadership:

Currently headquartered at Gandanthegchenling Monastery, Ulaanbaatar, under the presidency of Most Venerable Khambo Lama of Gandan, Gabji Demberel Choijamts.

Objectives:

Disseminate Lord Buddha's teachings on peace, harmony, compassion, and loving-kindness.

Consolidate efforts for universal peace, harmony, and cooperation among Asian peoples.

Foster economic and social advancement, justice, human dignity, and preservation of Buddhist culture.

Activities:

Held 11 General Conferences in various countries, drawing active participation from across Asia.

Published the journal "**Dharmaduta**" and maintained collaborations with organizations like the Christian Peace Conference and Afro-Asian People's Solidarity Organization.

Conducted regular Annual Consultative Meetings, with recent ones in New Delhi (2017), Dhaka (2018) Ulaanbaatar, the capital of Mongolia (in 2019).

Regional Presence:

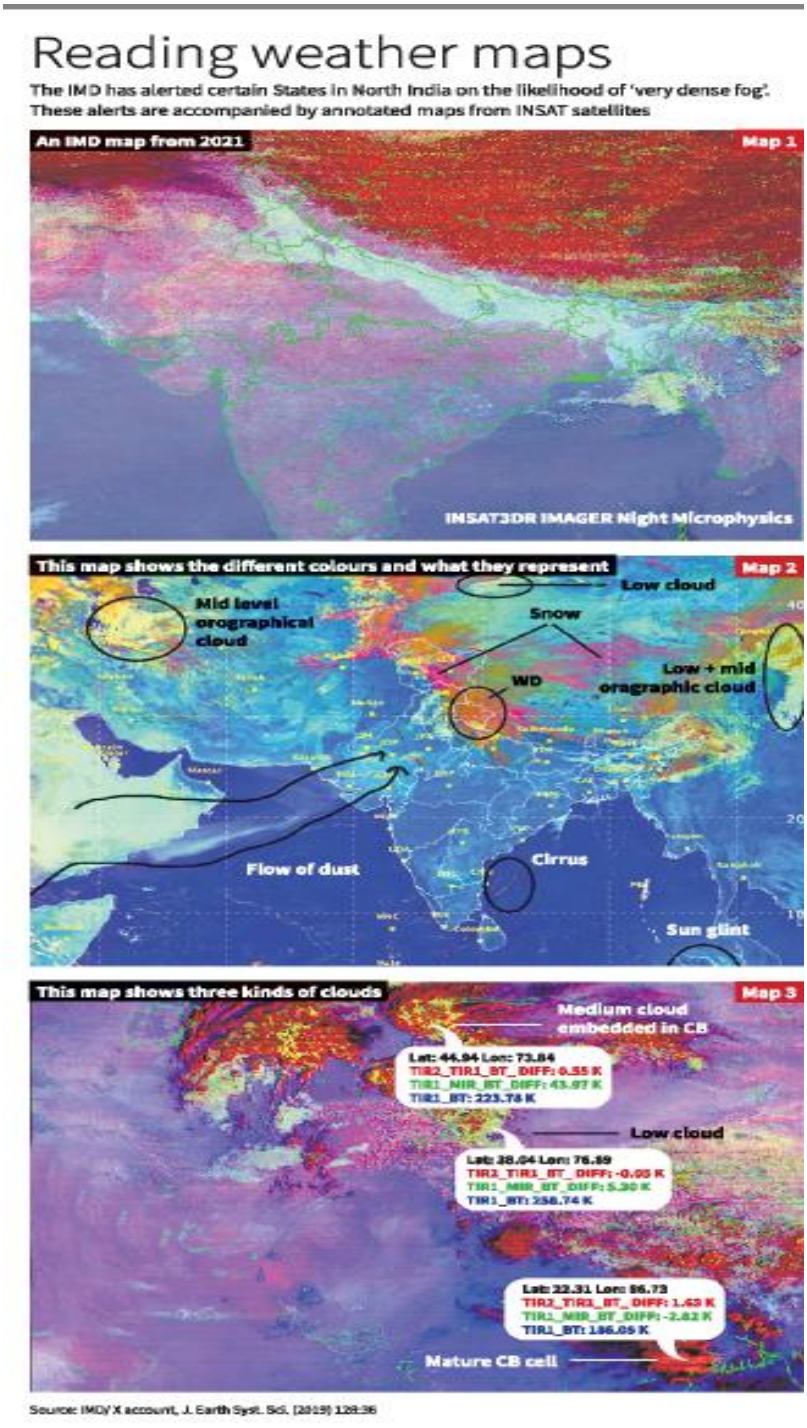
Active membership from North and South Korea, Bangladesh, Nepal, India, Central Tibetan Administration, Sri Lanka, Vietnam, Laos, Cambodia, Japan, and Russia.

Regional centers include ABCP Japan Center, ABCP Lao National Center, and ABCP Vietnam Center.

WEATHER TRACKING BY SATELLITES

In recent times, several regions in North India, including Bihar, Uttar Pradesh, Uttarakhand, Haryana, Delhi, and Punjab, have been experiencing persistent heavy fog since December 2023.

- The India Meteorological Department (IMD) has been actively monitoring and issuing warnings related to the dense fog conditions.



Details

Types of Weather Satellites

- **Geostationary Satellites (GEO):** Orbit at an altitude of approximately 35,786 kilometers above the equator, allowing them to remain stationary relative to a specific point on Earth. They provide continuous monitoring of a specific region, such as a continent or an ocean.

- **Polar Orbiting Satellites (PO):** Orbit the Earth from pole to pole, providing global coverage. They operate at lower altitudes (typically 800-1,200 kilometers) and are crucial for collecting detailed information about the atmosphere, including temperature, humidity, and cloud cover.

Instruments and Sensors

- **Visible and Infrared Sensors:** Capture images of clouds, land, and ocean surfaces. They help identify cloud cover, storm systems, and surface temperatures.
- **Microwave Sensors:** Penetrate clouds to measure temperature and humidity levels in different layers of the atmosphere.
- **Radiation and Energy Sensors:** Monitor incoming solar radiation and outgoing thermal radiation to study energy balance in the atmosphere.
- **Scatterometers:** Measure wind speed and direction over the ocean by analyzing the backscattered signals from ocean surfaces.

Data Collection

- Satellites continuously collect data on various atmospheric parameters, including temperature, humidity, wind speed, cloud cover, and precipitation.
- This data is transmitted to ground stations, where it undergoes processing and analysis.

Applications

- **Weather Forecasting:** Satellites provide real-time data that improves the accuracy of short-term and long-term weather forecasts.
- **Severe Weather Monitoring:** Satellites help track hurricanes, typhoons, tornadoes, and other severe weather events, allowing for early warnings and evacuation planning.
- **Climate Monitoring:** Long-term satellite data contribute to the study of climate patterns, climate change, and the Earth's overall climate system.

Integration with Other Systems

- Satellite data is integrated with ground-based observations, weather balloons, and other sources to create a comprehensive understanding of atmospheric conditions.
- Numerical weather prediction models use satellite data as input to simulate and predict future weather patterns.

Color Representation on Weather Maps

- The colors on the weather maps from INSAT 3D satellite **are determined by the solar reflectance and brightness temperature.**
- Solar reflectance is the ratio of solar energy reflected by a surface to the incident solar energy, and brightness temperature relates to the temperature of an object and the corresponding brightness of its surface.
- Different wavelengths (0.5 micrometers, 1.6 micrometers, and 10.8 micrometers) are used to detect visible radiation, shortwave infrared radiation, and thermal infrared radiation, respectively.

Reading the Maps

- The **color on each point of the image is determined by the strength of signals in these wavelengths.**
- For example, green color represents the strength of the 0.5 micrometer visible signal, red color represents the strength of the 1.6 micrometer shortwave infrared signal, and blue color represents the strength of the 10.8 micrometer thermal infrared signal.

Tracking Snow

- The color scheme is designed to identify different cloud types, stages of thunderstorms, snow areas, and fire detection.
- Snow strongly absorbs radiation at 1.6 micrometers (shortwave infrared), causing the red component of the color scheme to become weak when the satellite tracks snow.

Night Microphysics

- Night microphysics **involves the difference between two signals to determine colors.**

- Red color is determined by the difference between two thermal infrared signals (12 micrometers and 10 micrometers).
- Green color varies based on the difference between a thermal infrared signal and a middle infrared signal (10.8 micrometers and 3.9 micrometers).
- Blue color is determined by the strength of a thermal infrared signal at 10.8 micrometers.

Applications of Color Scheme

- The color scheme helps analyze cloud types, thunderstorm stages, snow areas, and fire detection.
- By combining day and night microphysics data, scientists can track moisture droplets, temperature differences, and cyclone formation, evolution, and depletion.

Satellite Instruments

- Both INSAT 3D and INSAT 3DR use radiometers to make spectral measurements.
- Radiometers measure various properties of radiation, and atmospheric sounders on these satellites measure temperature, humidity, and water vapor at different heights.

Future Developments

- The upcoming INSAT 3DS satellite is expected to be launched in February 2024, with improvements in spatial resolution, spectral channels, and functionality.

India's Weather Satellites

- INSAT 3D and 3DR are currently active in geostationary orbits, aiding in weather monitoring.
- India has a history of launching progressively advanced weather satellites, with each new version being an improved and better-equipped iteration of its predecessor.

DISTRESS ALERT TRANSMITTER

Indian Space Research Organisation (ISRO) has developed an improvised Distress Alert Transmitter (DAT) with advanced capabilities and features for the fishermen at sea to send emergency messages from fishing boats.

Details

Evolution

- The first version of DAT has been operational since 2010. Using this information, the MRCC coordinates to undertake search and rescue operations to save the fishermen in distress. Till now, more than 20,000 DATs are being used.

How does it work?

- It is an indigenous technological solution namely Distress Alert Transmitter (DAT) for the fishermen at sea to send emergency messages from fishing boats.
- The messages are sent through a communication satellite and received at a central control station (INMCC: Indian Mission Control Centre) where the alert signals are decoded for the identity and location of the fishing boat.
- The extracted information is forwarded to Maritime Rescue Co-ordination Centres (MRCCs) under Indian Coast Guard (ICG).

The second generation

- Further, taking advantage of technological developments in satellite communication and satellite navigation ISRO has improvised DAT with advanced capabilities and features evolving to Second Generation DAT (DAT-SG).
- **Acknowledgement:** The DAT-SG has the facility to send back acknowledgement to the fishermen who activates the distress alert from sea. This gives an assurance to him of rescue coming to him.
- **Real Time Information:** Apart from transmitting distress signal from Sea, DAT-SG has the capability to receive messages from control centre. Using this, advance alert messages can be sent to the fishermen at sea whenever there are events of bad weather, cyclone tsunami or any other emergencies. Thus, the fishermen will be able to sail back home or go to safe places.
- Further, the information about Potential Fishing Zones (PFZs) are also transmitted to fishermen using DAT-SG on regular intervals. This helps fishermen to get good yield in the catch and savings in terms of time and fuel.
- DAT-SG can be connected to mobile phones using Bluetooth interface and the messages can be read in native language using an App in the mobile.
- The central control centre (INMCC) has a web based network management system called “SAGARMITRA” which maintain a database of registered DAT-SGs and helps MRCCs to access the information about boat, coordinate the boat at distress in real time.
- This helps Indian Coast Guard to undertake Search & Rescue operations at the time of distresses, without any time delay.
- The services of DAT-SG has been declared operational on a 24 x 7 basis.

Initiatives for Fisherman’s safety

- **'Nabhmitra'** stands as an innovative satellite-based communication system. It facilitates seamless two-way messaging services, connecting fishing vessels with onshore authorities and control centers.

- **GEMINI** is a portable receiver that is linked to ISRO-satellites. With this device, the fishermen outside the signal range of their phone companies (i.e. 10-12 km) can also access warnings and alerts, as the device can send signals up to 300 nautical miles.