

GOVERNANCE**Smart Classes for Rural Schools**

Recently, RailTel has proposed to the Ministry of Education its plan for equipping rural schools, run by the central government, with the ability to hold 'smart classes'.

Key Points**About the Proposal:**

- The proposal is to power remote government schools with high-speed broadband and create an "Internet of Things" environment for learning.
- The plan is to create end-to-end e-learning solutions for the schools, using the solid Optical Fibre Cable network, which is the backbone of Indian Railways telecom operations.
- Behind the plan is the education sector's thrust on leveraging the gains of e-learning as a mode of instruction, at a time when the pandemic has forced teachers and students to migrate to virtual platforms and adopt IT-enabled interactive means for teaching.
- The cable network runs along railway tracks, and so as far as reach is concerned, there is the capability to impact rural schools anywhere in India, including the remotest locations which otherwise may not get reliable Internet.
- RailTel has already provided such connectivity to 723 institutions of higher learning under the Centre's National Knowledge Network programme, with broadband speed of up to 10 gigabytes per second.
- It would impact around 3.5 lakh students who are enrolled in these schools, which are run by the Central government predominantly for meritorious students in rural India.

RailTel:

- It is a "Mini Ratna (Category-I)" Central Public Sector Enterprise.
- It is an ICT (Information and Communication Technology) provider and one of the largest neutral telecom infrastructure providers in the country owning a Pan-India optic fiber network on exclusive Right of Way (ROW - for laying telecom cables) along Railway track.
- The OFC network covers all important towns & cities of the country and several rural areas.
- It has been selected for implementation of various mission-mode projects for the Government of India including rolling out the National Knowledge Network, Bharat Net and USOF (Universal Service Obligation Fund) funded optical fiber based connectivity project in North East India.

SOCIAL JUSTICE**Fighting Drug Addiction**

Recently, people in a few villages of Jodhpur district's Bilara block, Rajasthan have come together to tackle Drug Addiction among the youth.

Key Points**Steps Taken By the Villagers:**

- Boycott of persons consuming liquor, tobacco and narcotics.
- Imposition of a penalty on the sellers and buyers of these substances.

Drug Addiction:

- It refers to the condition of being addicted to a drug, particularly narcotic drugs.
- These are generally illegal drugs that affect the mood and behaviour of a person.
- Drug abuse refers to the use of certain chemicals for the purpose of creating pleasurable effects on the brain.
- There are over 190 million drug users around the world and the problem has been increasing at alarming rates, especially among young adults under the age of 30.

Drug Menace In India:

- The menace of drug addiction has spread fast among the youth of India.
- India is sandwiched between two largest Opium producing regions of the world that is the Golden triangle on one side and the Golden crescent on other.
- The golden triangle area comprises Thailand, Myanmar, Vietnam and Laos.



- The golden crescent area includes Pakistan, Afghanistan and Iran.
- As per the report Magnitude of Substance Use in India released by All India Institute Of Medical Science (AIIMS) in 2019:
- Alcohol is the most abused substance in India.
- Around 5 crore Indians reported to have used cannabis and opioids at the time of the survey (conducted in the year 2018).
- It has been estimated that there are about 8.5 lakh people who inject drugs.
- Of the total cases estimated by the report, more than half of them are contributed by states like Punjab, Assam, Delhi, Haryana, Manipur, Mizoram, Sikkim and Uttar Pradesh.
- About 60 lakh people are estimated to need help for their opioid use problems.
- More and more children are taking to alcohol consumption and the highest percentage of children who are addicted to alcohol are in Punjab followed by West Bengal and Uttar Pradesh.

Major Reasons for Drug Abuse:

- To be accepted by the peers.
- Increasing economic stress.
- Changing cultural values.
- Experimentation.
- Neurotic pleasure.
- Ineffective Policing.

Impacts of Drug Abuse:

- Higher risk of unintentional injuries, accidents, domestic violence incidents, medical problems, and death.
- Economic potential gets wasted.
- Affects relationships with family, friends creating emotional and social problems
- Increases financial burden.
- Drug abuse seriously affects our health, security, peace and development.
- Increase in diseases like Hepatitis B and C, Tuberculosis
- Drug dependence, low self esteem, hopelessness can lead to criminal action and even suicidal tendencies.

Challenges to Curb the Drug Menace:

Legally Available Drugs:

- Such as tobacco is a huge problem which is usually seen as a gateway drug which children take just to experiment with.

Lack of Availability of Rehabilitation Centres:

- There is a lack of rehabilitation centres. Also, NGOs operating de-addiction centres in the country, have failed to provide the required kind of treatment and therapy.

Smuggling of Drugs:

- Smuggling of drugs through the states like Punjab, Assam and Uttar Pradesh which share the border with neighbouring countries.

Government Initiatives to Tackle Drug Addiction:

- It constituted the Narco-Coordination Centre (NCORD) in November, 2016 and revived the scheme of “Financial Assistance to States for Narcotics Control”.
- Narcotics Control Bureau has been provided funds for developing a new software i.e. Seizure Information Management System (SIMS) which will create a complete online database of drug offences and offenders.
- The government has constituted a fund called “National Fund for Control of Drug Abuse” to meet the expenditure incurred in connection with combating illicit traffic in Narcotic Drugs; rehabilitating addicts, and educating the public against drug abuse, etc.
- The government is also conducting a National Drug Abuse Survey to measure trends of drug abuse in India through the Ministry of Social Justice & Empowerment with the help of National Drug Dependence Treatment Centre of AIIMS.
- 'Project Sunrise' was launched by the Ministry of Health and Family Welfare in 2016, to tackle the rising HIV prevalence in north-eastern states in India, especially among people injecting drugs.
- The Narcotic Drugs and Psychotropic Substances Act, (NDPS) 1985: It prohibits a person from producing, possessing, selling, purchasing, transporting, storing, and/or consuming any narcotic drug or psychotropic substance.
- The NDPS Act has since been amended thrice – in 1988, 2001 and 2014.
- The Act extends to the whole of India and it applies also to all Indian citizens outside India and to all persons on ships and aircraft registered in India.
- Government has also announced the launch of the ‘Nasha Mukh Bharat’, or Drug-Free India Campaign which focuses on community outreach programs.

International Treaties and Conventions to Combat Drug Menace:

- India is signatory of the following International treaties and conventions to combat the menace of Drug Abuse:
- United Nations (UN) Convention on Narcotic Drugs (1961)
- UN Convention on Psychotropic Substances (1971).
- UN Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances (1988)
- UN Convention against Transnational Organized Crime (UNTOC) 2000

Way Forward

- Addiction should not be seen as a character flaw, but as an ailment that any other person could be struggling with. Therefore, the stigma associated with drug taking needs to be reduced. Society needs to understand that drug-addicts are victims and not criminals.
- Certain crop drugs which have more than 50% alcohol and opioids need to be contained. Strict action is required from police officers and the excise and narcotics department to curb the problem of drug menace in the country. There is a need to strictly implement the NDPS Act.
- Radical political decisions like that one of alcohol prohibition in Bihar may be another solution. When people do not exercise self-control, a state has to step in, as part of the Directive Principles of State Policy (Article 47).
- Education curriculum should include chapters on drug addiction, its impact and also on de-addiction. Proper Counselling is another alternative.

SCIENCE & TECHNOLOGY AND BIODIVERSITY

Lithium-ion Technology

India, through a newly-floated state-owned company Khanij Bidesh India Ltd, has inked a pact with an Argentine firm to jointly prospect lithium in Argentina, a country that has the one of the largest reserves of Lithium in the world.

Key Points

- Khanij Bidesh India Ltd was incorporated in August 2019 by three state-owned companies, NALCO, Hindustan Copper and Mineral Exploration Ltd, with a specific mandate to acquire strategic mineral assets such as lithium and cobalt abroad.
- It is also learnt to be exploring options in Chile and Bolivia, two other top lithium-producing countries.
- Lithium is a crucial building block of the lithium-ion rechargeable batteries that power electric vehicles (EVs), laptops and mobile phones.
- Currently, India is heavily dependent on import of these cells and the move to ink sourcing pacts for lithium is also seen as a move to reduce its dependency on China which is a key source of both the raw material and cells.

- India is seen as a late mover as it attempts to enter the lithium value chain, coming at a time when Electric Vehicles are predicted to be a sector ripe for disruption.
- 2021 is likely to be a turning point for battery technology, with several potential improvements to the Li-ion technology, and alternatives to this tried-and-tested formulation, under advanced stages of commercialisation.

About Li-ion Batteries:

- A lithium-ion battery or Li-ion battery is a type of rechargeable battery.
- Li-ion batteries use an intercalated (Intercalation is the reversible inclusion or insertion of a molecule into materials with layered structures) lithium compound as one electrode material, compared to the metallic lithium used in a non-rechargeable lithium battery.
- The battery consists of electrolyte, which allows for ionic movement, and the two electrodes are the constituent components of a lithium-ion battery cell.
- Lithium ions move from the negative electrode to the positive electrode during discharge and back when charging.

Lithium-ion Battery Applications:

- Electronic gadgets, Tele-communication, Aerospace, Industrial applications.
- Lithium-ion battery technology has made it the favourite power source for electric and hybrid electric vehicles.
- Disadvantages of Li-ion Batteries:
 - Long charging times.
 - Weak energy density.
 - Safety issues as instances of batteries catching fires have been there.
 - Expensive to manufacture.
- While the Li-ion batteries are seen as sufficiently efficient for applications such as phones and laptops, in case of EVs, these cells still lack the range that would make them a viable alternative to internal combustion engines.

Potential Alternatives to Li-ion technology:**Graphene Batteries:**

- Graphene batteries may be an important alternative to lithium-ion batteries, with the latter having limitations due to the frequency with which lithium requires charging. Graphene is a newly stabilized and isolated material.

Fluoride Batteries:

- Fluoride Batteries have the potential to last eight times longer than lithium batteries.

Sand Battery:

- This alternative type of lithium-ion battery uses silicon to achieve three times better performance than current graphite Li-ion batteries. The battery is still lithium-ion like the one found in a smartphone, but it uses silicon instead of graphite in the anodes.

Ammonia-powered Batteries:

- Ammonia-powered batteries may not be coming any time soon, but the chemical commonly known as a household cleaner is still an alternative to lithium in the way it can power fuel cells in vehicles and other equipment.
- If scientists can figure out a way to produce ammonia without creating the greenhouse gas emissions that result right now, they can ship it anywhere in the world to be converted into hydrogen to power those fuel cells.

Lithium-Sulfur Batteries:

- Researchers in Australia say they have developed the world's most powerful rechargeable battery using lithium-sulfur, said to perform four times better than the strongest batteries currently available.

Vertically Aligned Carbon Nanotube Electrode:

- These are good candidates for lithium-ion battery electrodes which require high rate capability and capacity.

Solid-state Batteries:

- It uses alternatives to aqueous electrolyte solutions, an innovation that could lower the risk of fires, sharply increase energy density and potentially take only 10 minutes to charge an EV, cutting the recharging time by two-thirds.

- These cells can extend the driving distance of a compact electric vehicle while maintaining legroom - a quantum leap in battery tech.

GEOGRAPHY

Report on Lightning Strikes

According to a report published by the Climate Resilient Observing Systems Promotion Council (CROPC), the number of deaths due to lightning strikes reduced by nearly 37% in 2019-20. CROPC is a non-profit organisation that works with the India Meteorological Department (IMD).

Key Points

Data Analysis:

- Lightning-linked fatalities formed 33% of total deaths in natural disasters in 2019-20.

Factors Responsible:

- The rapid degradation of environment like global warming, deforestation, depletion of water bodies, concretisations, rising pollution and aerosol levels have cumulatively pushed the environment to extremes. And lightning is direct promulgation of these climatic extremities.

Suggestions:

- States should participate in Lightning Resilient India Campaign and undertake lightning risk management more comprehensively.
- IMD has launched a joint campaign named Lightning Resilient India Campaign along with CROPC and duly supported by Indian Meteorological Society (IMS), NGOs, IIT Delhi and other concerned institutions.
- Early lightning warning to farmers, cattle grazers, children and people in open areas.
- Lightning strikes around a fixed period and almost similar geographical locations in similar patterns.
- Kalbaishakhi - Norwesters, which are violent thunderstorms with lightning - claims life in eastern India and pre-monsoon lightning deaths occur mostly in Bihar, Jharkhand, Chhattisgarh and UP.
- Implement a local lightning safety action plan like installing Lightning Protection Devices.
- Lightning fatalities should be notified as a disaster to prevent losses.
- It needs to be noted that the Centre has not notified lightning as a disaster.
- Although the National Disaster Management Authority (NDMA) has issued comprehensive guidelines for action plans to states, a large number of losses show that the implementation needs a more “scientific and focused community-centric approach”, besides convergence of various departments.
- Mapping of lightning is a major breakthrough in identifying the precise risk in terms of lightning frequency, current intensity, energy content, high temperature and other adverse impacts.
- With continuous mapping for at least three years, a climatology can be established. This would yield a Lightning Risk Atlas map for India which will form the basis for a lightning risk management programme.

Lightning

Meaning:

- It is a very rapid and massive discharge of electricity in the atmosphere. It is the process of occurrence of a natural ‘electrical discharge of very short duration and high voltage between a cloud and the ground or within a cloud’, accompanied by a bright flash and sound, and sometimes thunderstorms.
- Inter cloud or intra cloud (IC) lightning are visible and harmless.
- It is cloud to ground (CG) lightning, which is harmful as the ‘high electric voltage and electric current’ leads to electrocution.

Process:

- It is a result of the difference in electrical charge between the top and bottom of a cloud.
- The lightning-generating clouds are typically about 10-12 km in height, with their base about 1-2 km from the Earth’s surface. The temperatures at the top range from -35°C to -45°C.
- As water vapour moves upwards in the cloud, it condenses into water due to decreasing temperatures. A huge amount of heat is generated in the process, pushing the water molecules further up.

- As they move to temperatures below zero, droplets change into small ice crystals. As they continue upwards, they gather mass, until they become so heavy that they start descending.
- It leads to a system where smaller ice crystals move upwards while larger ones come down. The resulting collisions trigger release of electrons, in a process very similar to the generation of electric sparks. The moving free electrons cause more collisions and more electrons leading to a chain reaction.
- The process results in a situation in which the top layer of the cloud gets positively charged while the middle layer is negatively charged.
- In little time, a huge current, of the order of lakhs to millions of amperes, starts to flow between the layers.
- It produces heat, leading to the heating of the air column between the two layers of cloud.
- It is because of this heat that the air column looks red during lightning.
- The heated air column expands and produces shock waves that result in thunder sounds.

Strikes Earth's Surface:

- The Earth is a good conductor of electricity. While electrically neutral, it is relatively positively charged compared to the middle layer of the cloud. As a result, an estimated 20-25% of the current flow is directed towards the Earth.
- It is this current flow that results in damage to life and property.
- Lightning has a greater probability of striking raised objects on the ground, such as trees or buildings.
- Lightning Conductor is a device used to protect buildings from the effect of lightning. A metallic rod, taller than the building, is installed in the walls of the building during its construction.
- The most lightning activity on Earth is seen on the shore of Lake Maracaibo in Venezuela.
- At the place where the Catatumbo river falls into Lake Maracaibo, an average 260 storm days occur every year, and October sees 28 lightning flashes every minute - a phenomenon referred to as the Beacon of Maracaibo or the Everlasting Storm.

Concretisation

- Concretisation or the increase in paved surfaces has a suffocating impact on trees and turns a city into an urban heat island with extremely low ground water and threats of floods looming large in monsoons due to surface run-off.
- The concrete surface, be it buildings or roads or footpaths radiate heat waves in the evening, making nights as hot as days and decreasing the difference between the maximum and the minimum temperatures, resulting in urban heat island effect.
- During concretisation, the carbon stored in the soil escapes into the atmosphere, which then gets oxidised to form carbon dioxide, a major greenhouse gas leading to temperature escalation.

IMPORTANT FACTS FOR PRELIM**Banana Grit**

Recently, scientists at the Council of Scientific & Industrial Research (CSIR)-National Institute for Interdisciplinary Science and Technology (NIIST) at Pappanamcode in Kerala have come up with a new product, Banana Grit or Granules, developed from raw Nendran bananas.

CSIR is the largest research and development (R&D) organisation in India.

Key Points**About Banana Grit:**

- Banana Grit and its byproduct can improve gut health and is an ideal ingredient in a healthy diet. The concept was introduced to utilise the presence of resistant starch in bananas.
- Starch is a white, granular, organic chemical that is produced by all green plants. It is a soft, white, tasteless powder that is insoluble in cold water, alcohol, or other solvents.
- In humans and other animals, starch from plants is broken down into its constituent sugar molecules, which then supply energy to the tissues.

Significance:

- By diversifying the products sourced from Banana, farmers can fetch better prices for their harvest.
- It will help in maintaining health and well-being.

Nendran bananas:

- Chengazhikodan Nendran Banana, also known as Chengazhikode Banana, is among the most popular traditional fruits cultivated in Thrissur district, Kerala.
- This variety of Nendran Banana is famed for its characteristic taste, bunch shape and fruit colour.
- The crop is mainly cultivated in organic mode and the crop duration is 13-14 months.
- The Chengalikodan Nendran banana grown in Kerala got Geographical indication (GI) Tag in 2014.
- GI refers to any indication that identifies the goods as originating from a particular place, where a given quality, reputation or other characteristic of the goods is essentially attributable to its geographical origin.

DAILY ANSWER WRITING PRACTICE

Qns. Contrary to popular perception, India's sex ratio at birth declined even as per capita income increased. Discuss. (250 words)

Ans:

India's sex ratio at birth declined even as per capita income increased nearly 10 times over the last 65 years, according to an IndiaSpend analysis of government data. The recently published Sample Registration System (SRS) Report 2018 shows the same that that sex ratio at birth in India, declined from 906 in 2011 to 899 in 2018.

This could be because rising income, which results in increased literacy, makes it easier for families to access sex-selective procedures. This can be corroborated by the fact that many Indian cities has high economic growth but lower figures on sex ratio than rural areas.

- Despite improved per capita income in India, askewed sex ratio in India continue to exist due to perpetuation of patriarchal attitudes and discriminatory cultural practices:
- Continuation of Gender Bias: According to information from the UNPFA, reasons for female infanticide include anti-female bias, as women are still seen as subservient to men, who often employ positions of power. As a result, girls continue to suffer educational, health and nutritional discrimination.
- Son-Preference: In addition, despite numerous efforts to inculcate the idea of gender equality in India, parents still believe they will be better taken care of in their old age by men, as men are perceived as the principal wage earners of the family.
- Social Practices: Despite banning dowry and making it a criminal offense, the dowry system is still prevalent in India. Parents of girls are still required to pay a dowry, which could be a massive expense, avoided by raising males. In many cases dowry is taken even if the bride itself is economically self independent.
- Accessibility to postnatal sex selection techniques: India recorded more than thirteen excess deaths for every 1000 girls under five years of age. This is the highest rate of female deaths in under the age of five years in the world. Better income and awareness of postnatal sex selection techniques may be attributed for this dismal picture.

Other Issues Related to Lower Sex Ratio at Birth

- Gender-imbalance: Prof. Amartya Kumar Sen, in his world famous article "Missing Women? has statistically proved that during the last century, 100 million women have been missing in south Asia.
- This is due to discrimination leading to death, experienced by them from womb to tomb in their life cycles. An adverse child sex ratio is also reflected in the distorted gender makeup of the entire population.
- Distortion in the Marriage System: Adverse ratio results in a gross imbalance in the number of men and women and its inevitable impact on marriage systems as well as other harms to women.
- In India, some villages in Haryana and Punjab have such poor sex ratios that men "import" brides from other States. This is often accompanied by the exploitation of these brides. There are concerns that skewed sex ratios lead to more violence against both men and women, as well as human-trafficking.

Measures Needed To Improve The Lower Sex Ratio At Birth.

- Bringing Behavioural Change: Increasing female education and economic prosperity help to improve the ratio.
- In this pursuit, the government's Beti-Bachao Beti Padhao Campaign has achieved remarkable success in bringing behavioural change in the society.
- Sensitizing Youth: There is an urgent need to reach young people for reproductive health education and services as well as to cultivate gender equity norms.

- For this, the services of Accredited Social Health Activist (ASHA) can be leveraged, especially in rural areas.
- Stringent Enforcement of Law: India must implement the Pre-Conception and Pre-Natal Diagnostic Techniques (PCPNDT) Act, 1994 more stringently and dedicate more resources to fighting the preference for boys.
- In this context, the Drugs Technical Advisory Board decision to include ultrasound machines in the Drugs and Cosmetics Act, 1940 is a step in the right direction.

Conclusion

Although India has created several impressive goals to reduce its population growth rates, India and the rest of the world has a long way to go to achieve meaningful population policy which are not only based on quantitative control but qualitative control as well.

DAILY QUIZ

1. With reference to trans fatty acids (TFA), consider the following statements:

1. The natural TFAs are present in meats and dairy products.
2. They have adverse effects on a human body.

Which of the statements given above is/are correct?

- a) 1 only
- b) 2 only
- c) **Both 1 and 2**
- d) Neither 1 nor 2

2. Consider the following statements:

1. Nendran Bananas are cultivated in Thrissur district of Kerala.
2. The Nendran Bananas got their Geographical Indication (GI) Tag in 2014.
3. IIT-Madras has developed a new product called Banana Grit from the raw Nendran Bananas.

Which of the statements given above is/are not correct?

- a) 1 and 2 only
- b) 2 only
- c) **3 only**
- d) 2 and 3 only

3. Which of the following international treaties and conventions are signed by India to combat drug menace?

1. United Nations (UN) Convention on Narcotic Drugs (1961)
2. UN Convention on Psychotropic Substances (1971)
3. UN Convention against Transnational Organized Crime (UNTOC) 2000

Select the correct answer using the code given below:

- a) 1 and 2 only
- b) 2 and 3 only
- c) 1 only
- d) **1, 2 and 3**

4. With reference to RailTel, consider the following statements:

1. RailTel is a Maharatna Central Public Sector Enterprise.
2. It has been selected for implementation of Bharat Net project.

Which of the statements given above is/are correct?

- a) 1 only
- b) **2 only**
- c) Both 1 and 2
- d) Neither 1 nor 2

5. With reference to Lightning, consider the following statements:

1. Collisions between smaller ice crystals and larger ones in the clouds generates the electric sparks.
2. The difference in electrical charge between the top and bottom of a cloud, results in lightning.
3. The Earth is a good conductor of electricity

Which of the statements given above are correct?

- a) 1 only
- b) 2 and 3 only
- c) 1 and 2 only
- d) **1, 2 and 3**