

You & Technology Dec-2021



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GOOD MORNING TIMES S&T (DECEMBER-2021)

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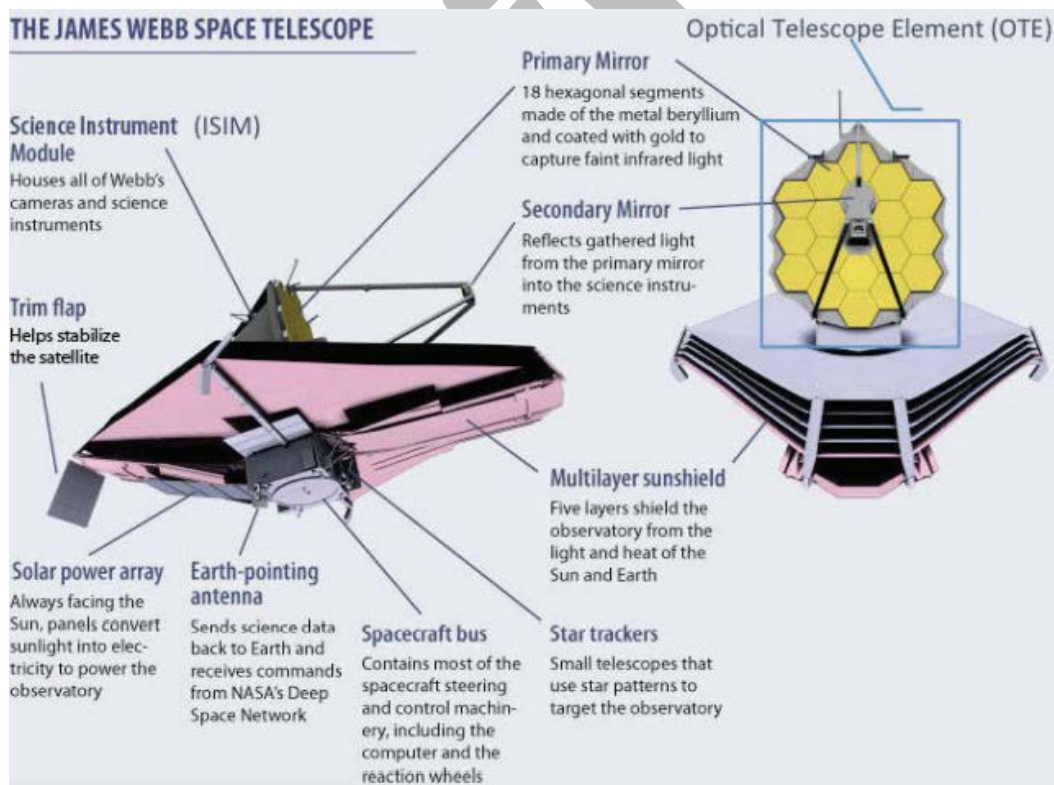
General Studies Paper-3 – S&T – Dec 2021

NASA's New Communications System: LCRD

- It is the first-ever laser communications system that will pave the way for future optical communications missions. Currently, most NASA spacecraft use radio frequency communications to send data
- Recently, NASA (National Aeronautics and Space Administration) has launched its new Laser Communications Relay Demonstration (LCRD).
- It has two optical terminals. One to receive data from a user spacecraft, and the other to transmit data to ground stations. □
- The modems will translate the digital data into laser signals. This will then be transmitted via encoded beams of light.
- These capabilities make LCRD NASA's first two-way, end-to-end optical relay.
- Laser uses infrared light and has a shorter wavelength than radio waves. This will help the transmission of more data in a short time.

James Webb Space Telescope

- The James Webb Space Telescope (JWST) is scheduled to be rocketed into orbit later this year (2021).



• It is the most powerful infrared telescope of National Aeronautics and Space Administration (NASA) & considered a successor of the Hubble Telescope and will extend and complement its discoveries.

• The telescope is the result of an international collaboration

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between NASA, the European Space Agency (ESA) and the Canadian Space Agency.

- It will be launched on an Ariane 5 ECA rocket from French Guiana in South America.
- It will also search for atmospheres similar to Earth's, and for the signatures of key substances such as methane, water, oxygen, carbon dioxide, and complex organic molecules, in hopes of finding the building blocks of life

Webb Vs Hubble

- The JWST will observe primarily in the infrared range whereas The instruments on Hubble see mainly in the ultraviolet and visible part of the spectrum.
- Webb's near- and mid-infrared instruments will help study the first formed galaxies, exoplanets and birth of stars.
- Hubble can see the equivalent of "toddler galaxies" while Webb Telescope will be able to see "baby galaxies".

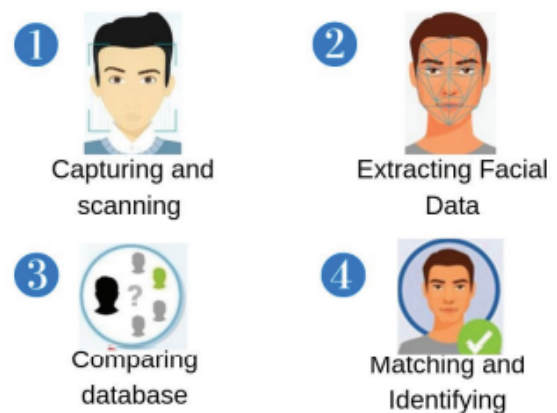
Other Major Infrared Telescope

- Herschel Space Observatory Telescope: It is an infrared telescope, launched in 2009 by the European Space Agency.
- It also orbits the Sun similar to how Webb would. The primary difference between Webb and Herschel is the wavelength range: Webb goes from 0.6 to 28 microns, while Herschel covers 60 to 500 microns.

Facial Recognition Technology

- It is a biometric technology that uses distinctive features of the face to identify and distinguish an individual.
- Over a period of almost 6 decades, it has evolved in many ways- from looking at 3D contours of a face to recognizing skin patterns.
- In the Automated Facial Recognition System (AFRS), the large database (containing photos and videos of peoples' faces) is used to match and identify the person.
- The facial recognition system works primarily by capturing the face & its features through the camera and then using various kinds of software to reconstruct those features.
- The captured face along with its features is stored into a database, which can be integrated with any kind of software that may be used for security purposes, banking services, etc.
- After a delay of three years, passengers will be

How Facial Recognition Systems Work



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able to use a face scan as their boarding pass at four airports (Varanasi, Pune, Kolkata and Vijayawada) in the country from 2022.

Abundance of Lithium in Stars

- Lithium is a trace element on Earth, and a key component of rechargeable batteries.
- Recently, Scientists have found a clue to the mystery behind the high abundance of Lithium in some evolved stars.
- The mystery is the reason behind the high abundance of Lithium in stars, which according to predicted models must get destroyed in the hot plasma of the star.
- Regarding the reason for Lithium production, scientists have for the first time confirmed that all the lithium-rich stars are burning helium in their core.
- It is proposed to be a simple and short sequence of nuclear reactions involving a collision between the two stable helium isotopes which led to a stable lithium isotope.

About Lithium:

- It is a soft, silvery-white metal. Under standard conditions, it is the lightest metal and the lightest solid element. It is highly reactive and flammable, and must be stored in mineral oil.
- Lithium has become the new 'white gold' as the demand for high performing rechargeable batteries is rising.
- Rising global lithium demand and surging prices have drawn increased interest in the so-called 'lithium triangle' that spans parts of Argentina, Bolivia and Chile.
- Countries with Largest Reserves: ☐ Chile > Australia > Argentina
- Researchers at the Atomic Minerals Directorate (under India's Atomic Energy Commission) have estimated lithium reserves of 14,100 tonnes in a small patch of land surveyed in Southern Karnataka's Mandya district recently.

Other Potential Sites in India:

- The major mica belts in Rajasthan, Bihar, and Andhra Pradesh.
- Pegmatite (igneous rocks) belts in Odisha and Chhattisgarh.
- Brines of Sambhar and Pachpadra in Rajasthan, and Rann of Kachchh in Gujarat.
- India, through a newly state-owned company Khanij Bidesh India Ltd, had signed an agreement with an Argentinian firm to jointly prospect lithium in Argentina

Log4Shell Vulnerability

- A critical vulnerability called Log4Shell is now being exploited by attackers to target organizations all over the world, including India.
- The vulnerability is dubbed Log4Shell and is officially called CVE-2021-44228. CVE number is the unique number given to each vulnerability discovered across the world.
- The vulnerability was first detected on websites that were hosting servers of a Microsoft-owned game called Minecraft.

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- In computer security, a vulnerability is a weakness which can be exploited by a threat actor, such as an attacker, to cross privilege boundaries (i.e. perform unauthorized actions) within a computer system.

Supersonic Missile Assisted Torpedo

- It is a missile assisted release of the lightweight Anti-Submarine Torpedo System for anti-submarine warfare (ASW) operations far beyond torpedo range. It is a canister based missile system.
- Torpedo is a cigar-shaped, self-propelled underwater weapon, launched from a submarine, surface vessel, or airplane and designed for exploding upon contact with the hulls of surface vessels and submarines.
- Varunastra is the first indigenous heavyweight ship launched anti-submarine electric torpedo.
- Project 75 is a programme by the Indian Navy that entails building six Scorpene-Class attack submarines (Kalvari, Khanderi, Karanj, Vela, Vagir and Vagsheer).

Indian Army sets up Quantum Lab, Artificial Intelligence Centre

- The Quantum Computing Laboratory has been established with the help of the National Security Council Secretariat (NSCS), to spearhead research and training in this key developing field.
- Quantum Technology is based on the principles of Quantum mechanics that was developed in the early 20th century to describe nature at the scale of atoms and elementary particles.
- Using quantum superposition, a set of unbreakable codes or super-speedy information processing, quantum computers are able to mimic several classical computers working in parallel
- Quantum computers compute in 'qubits' (or quantum bits). They exploit the properties of quantum mechanics, the science that governs how matter behaves on the atomic scale.

Applications:

- China recently demonstrated secure quantum communication links between terrestrial stations and satellites.
- It can help in solving some of the fundamental questions in physics related to gravity, black holes etc.
- Tsunamis, drought, earthquakes and floods may become more predictable with quantum applications.
- Quantum computing is an integral part of Industrial revolution 4.0.

Related Indian Initiatives:

- Budget 2020 allocated Rs 8000 Crore to a National Mission on Quantum Technologies & Applications (NM-QTA) for a period of five years
- In 2018, the Union Cabinet approved the launch of the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS) to make India a leading player in Cyber-Physical Systems.

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- In 2018, the government initiated serious discussions in quantum technologies and kick started research projects across 51 organisations under QUEST – Quantum Enabled Science and Technology.

New Vaccines and Drug for Covid

- India has approved two Vaccines Corbevax and Covovax, one pill Molnupiravir for treating Covid-19 patients.
- Corbevax - Protein Subunit Vaccine is a protein subunit vaccine, which means that instead of the whole virus, it uses fragments of it to trigger an immune response.
- In this case, the subunit vaccine contains a harmless Spike (S) protein that plays a crucial role in penetrating host cells and initiating infection.
- Once the immune system recognises the protein, it produces antibodies to fight a real infection when it happens
- Covavax - Recombinant Nanoparticle Vaccine uses Recombinant Nanoparticle Technology (RNT).
- This technology teaches the body how to develop immunity against the virus using spike protein.
- Harmless copies of the spike protein are grown in insect cells; the protein is then extracted and assembled into virus-like nanoparticles.

[Types of Vaccines - AspireIAS- Read Here](#)

Controlled Aerial Delivery System

- a flight demonstration of the Controlled Aerial Delivery System of 500 kg capacity (CADS-500) was conducted by Aerial Delivery Research and Development Establishment (ADRDE)
- ADRDE is an Research & Development laboratory of the Defence Research and Development Organisation (DRDO) involved in the development of paratrooper parachute systems.
- The CADS-500 is used for precise delivery of payload upto 500 kgs at predetermined location by making use of manoeuvrable capabilities of Ram Air Parachute (RAP)
- It uses the Global Positioning System for the coordinates, altitude and heading sensors for the heading information during its flight. □
- The CADS, with its onboard electronics unit, autonomously steers its flight path using waypoint navigation towards target location by operating controls.

5G in India

- Department of Telecommunications (DoT) has announced that India's major metros will have 5G services next year.
- 5G is the 5th generation mobile network. It is a new global wireless standard after 1G, 2G, 3G, and 4G networks. □
- It enables a new kind of network that is designed to connect virtually everyone and everything together including machines, objects, and devices.

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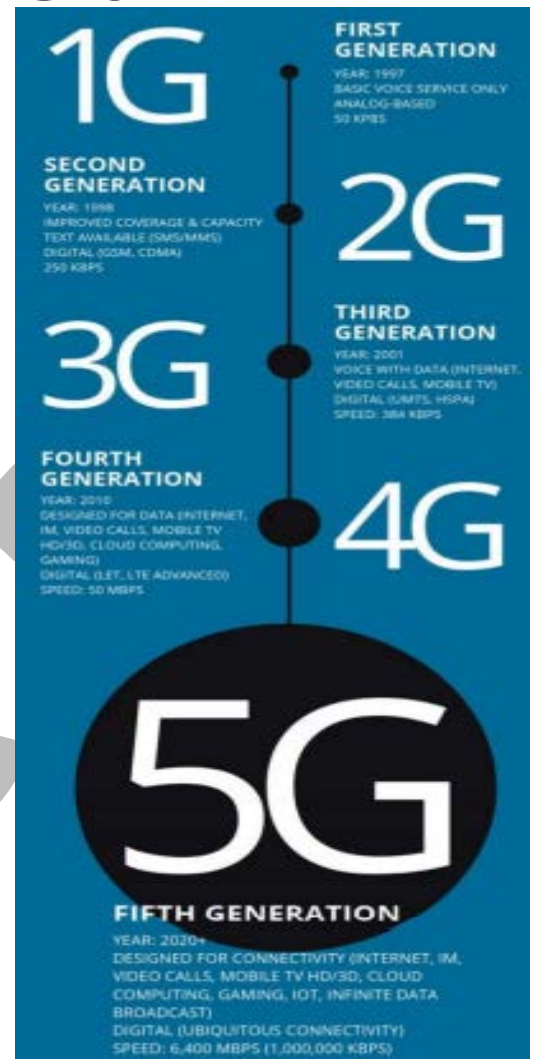
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Different Bands of 5G:

5G mainly works in 3 bands, namely low, mid and high frequency spectrum

- Low Band Spectrum: In terms of coverage and speed of Internet and data exchange, the maximum speed is limited to 100 Mbps
- telecom companies can use and install it for commercial cellphone users who may not have specific demands for very high speed Internet. may not be optimal for specialised needs of the industry
- Mid Band Spectrum: It offers higher speeds compared to the low band, but has limitations in terms of coverage area and penetration of signals.
- used by industries and specialised factory units for building captive networks that can be moulded into the needs of that particular industry.
- High Band Spectrum: It offers the highest speed of all the three bands, but has extremely limited coverage and signal penetration strength.



Pralay Missile

- Defence Research and Development Organisation (DRDO) has successfully conducted maiden flight test of a new indigenously developed surface-to-surface missile 'Pralay'
- Pralay' is India's first conventional quasi-ballistic missile. It is a derivative of the Prahaar missile.
- Prahaar is a surface-to-surface missile with a range of 150 km. □
- Primary objective is to bridge the gap between the unguided Pinaka multi-barrel rocket launcher and the guided Prithvi missile variants
- A quasi-ballistic missile has a low trajectory, and while it is largely ballistic, it can maneuver in flight.
- The missile has been developed in a way that it is able to defeat the interceptor missiles and also has the ability to change its path after covering a certain range mid-air.
- It is powered with a solid propellant rocket motor and many new technologies.

Ballistic Missile vs Cruise Missile

Ballistic Missile	Cruise Missile
Travel in projectile motion and trajectory depends on gravity, air resistance and Coriolis Force.	➤ Comparatively follows a straight trajectory of motion.
Leave the earth's atmosphere and re enter it.	➤ The flight path is within the earth's atmosphere.
Long-range missiles (300 km to 12,000 km)	➤ Short range missiles (range upto 1000 km)
E.g. Prithvi I, Prithvi II, Agni I, Agni II and Dhanush missiles.	➤ E.g. BrahMos missiles

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Agni-P Missile

- Defence Research and Development Organisation (DRDO) successfully test-fired the new generation nuclear-capable ballistic missile 'Agni Prime'.
- Agni-P is a two-stage canisterised solid propellant missile with dual redundant navigation and guidance system
- Canisterisation of missiles reduces the time required to launch the missile while improving the storage and ease of handling. □
- The surface-to-surface ballistic missile has a range of 1,000 to 2,000 km

<https://www.aspireias.com/newspaper-notes-upsc-general-studies/upsc-general-studies-Missile-Development>

Jaitapur Nuclear Reactors: Maharashtra

- Centre has given in-principle (first step) approval for setting up of six nuclear power reactors at Jaitapur in Maharashtra.
- The Jaitapur Project is a key component of the strategic partnership between India and France
- Jaitapur would be the world's most powerful nuclear power plant with an installed capacity of 9.6 GWe that will produce low carbon electricity
- It would provide electricity to seven crore households.
- The Atomic Energy Act, 1962 was framed and implemented with the set objectives of using two naturally occurring elements Uranium and Thorium having good potential to be utilised as nuclear fuel in Indian Nuclear Power Reactors.

NATIONAL STRATEGY ON BLOCKCHAIN

- Blockchain is a distributed or decentralised ledger technology which was first introduced in the design and development of cryptocurrency, Bitcoin in 2009 by Satoshi Nakamoto.
- Blockchain is a series of blocks, where each block contains details of transactions executed over the network, hash(address) of the previous block, timestamp etc.
- Data and transactions stored in blocks are secured against tampering using cryptographic hash algorithms and are validated and verified through consensus (consensus protocols) across nodes of the Blockchain network.
- National Strategy on Blockchain has been formulated by the Ministry of Electronics & Information Technology (MeitY)

Significance of the technology

- Blockchain technology provides efficient distributed ledger storage mechanism with appropriate authentication and authorization thereby eliminating the need for a third party to validate the transactions.

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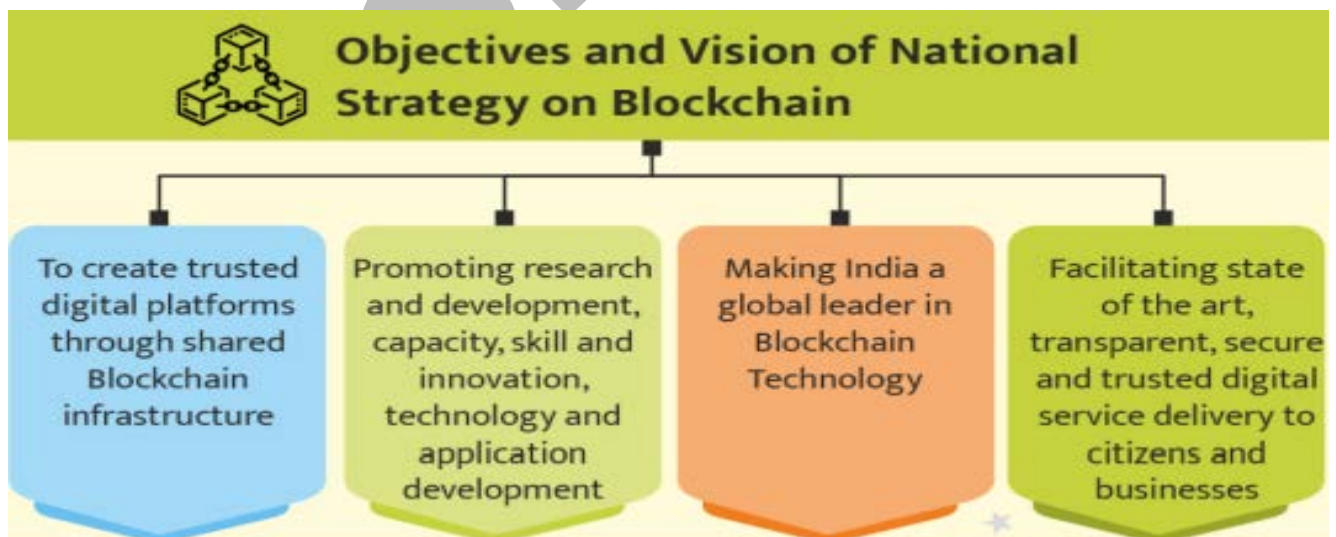
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- Any tangible or intangible asset of value can be represented and tracked on a Blockchain network, which brings transparency, increases processing speed and reduces cost.
- A system that is based on data stored in a number of places is immune to hackers. It is not that easy to get access to it, and if so, any piece of information can be easily recovered.
- Blockchain can be used in both Permissioned and Permission-less models. These models have applications in various domains such as education, governance, finance & banking, healthcare, logistics, cyber security, media, legal, power sector, etc

Blockchain Models

Public/Permissionless	Private/Permissioned
Anyone can join, read, write and commit	Only authorized participants can write and commit
All are allowed to participate in consensus and anonymous resilient	Authorized nodes only can participate in consensus
Truly decentralized because of participation of unknown actors	Partially decentralized because of participation of known actors
Finality of transaction could take longer time due to more number of participants	Finality of transactions could be better in this model due to less number of participants

This framework comprises following components for a multi-pronged strategy:



- Geographically distributed nodes across the country
- R&D for Blockchain Challenges

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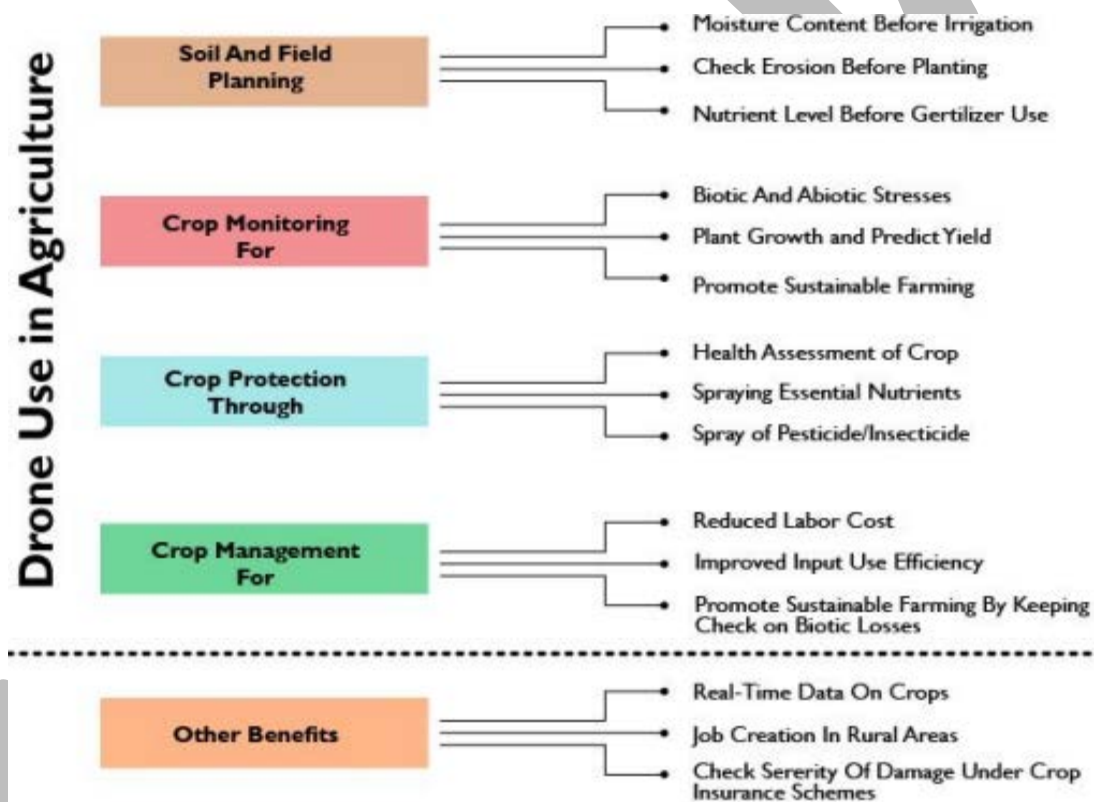
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- To design and develop an indigenous Blockchain platform
- Integration with important National Level Services
- The existing regulations and policies would be updated as needed
- Central and state Governments shall formulate their respective schemes and guidelines detailing out fiscal and non-fiscal incentives
- Human Resource Development

DRONE TECHNOLOGY IN AGRICULTURE

Standard Operating Procedure (SOP) for use of Drone in Pesticide Application for Crop Protection and for spraying Soil and Crop Nutrients been released.

Potential of Drone Technology use in Agriculture:



ASSISTED REPRODUCTIVE TECHNOLOGY (ART) REGULATION ACT 2021

Parliament has passed the ART Regulation Act 2021 that provides for the safe and ethical practice of ART services.

Key provisions:

- ART to include all techniques that seek to obtain a pregnancy by handling sperm or oocyte (immature egg cell) outside human body and transferring gamete or embryo into the reproductive system of a woman.

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- Every ART clinic and bank must be registered under the National Registry of Banks and Clinics of India.
- National Registry established will act as a central database with details of all ART clinics and banks in the country.
- State governments will appoint registration authorities for facilitating the registration process
- Registration Authority will have the chairperson, who will be an officer above the rank of Joint Secretary in the Health Department.
- ART bank is an organisation that is set up to supply sperm or semen, oocytes, or oocyte donors to ART clinics or their patients.
- Child born through ART will be deemed to be a biological child of commissioning couple and will be entitled to rights and privileges available to a natural child of the commissioning couple.
- A donor will not have any parental rights over the child.
- National and State Boards: These are constituted under the Act to regulate ART services.
- State Boards will coordinate enforcement of the policies and guidelines for ART as per the recommendations, policies, and regulations of the National Board.
- No court will take cognisance of offences under the Act, except on a complaint made by the National or State Board or any officer authorised by the Boards.
- Act introduced stringent punishment for those practising sex selection, sale of human embryos or gametes, running agencies, rackets, and organisations violating the law.
- Conditions for gamete donation and supply, offering ART services have also been prescribed.

Types of ARTs

ART is used to treat infertility.

- **In Vitro Fertilization (IVF):** It is the most common form of ART that is used by maximum patients. In this, woman's eggs are combined with man's sperm in a laboratory. The fertilised egg is then placed inside the woman's uterus in a procedure called embryo transfer.
 - **Mitochondrial Replacement therapy (MRT)** with a concept of three parent baby is a form of IVF.
- **Gamete intrafallopian transfer (GIFT):** The man's sperm and a woman's egg are made to combine in a lab. Then the eggs are implanted into the fallopian tubes and the fertilization occurs inside a woman's body.
- **Intrauterine insemination (IUI):** Also known as **artificial insemination**, it involves insertion of the male partner's (or a donor's) sperm into a woman's uterus at or just before the time of ovulation by long narrow tube.
- **Gestational Surrogacy:** In this, the embryo is created via IVF, using the eggs and sperm of the intended parents or donors, and is then transferred to the surrogate. The child is thus not biologically related to the surrogate mother, who is often referred to as a gestational carrier.

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WORLD MALARIA REPORT 2021

- the World Health Organization (WHO) has released the World Malaria Report 2021
- Malaria is a life-threatening mosquito borne blood disease caused by plasmodium parasites, and spread through the bites of infected female Anopheles mosquitoes.
- It is preventable as well as curable. WHO has recommended broad use of the RTS,S/AS01 (RTS,S) malaria vaccine. This recombinant protein vaccine has been shown to significantly reduce malaria, and deadly severe malaria among young children.

Key findings:

- Sub-Saharan Africa continues to carry the heaviest malaria burden, accounting for about 95% of all cases
- Malaria deaths increased by 12% globally in 2020 compared with 2019.
- India accounted for 83% of cases in the WHO South-East Asia Region
- Globally, 40 countries and territories have now been granted a malaria-free certification from WHO

Goals, milestones and targets for the Global technical strategy for malaria 2016-2030

GOALS	MILESTONES		TARGETS
	2020	2025	2030
1.Reduce malaria mortality rates globally compared with 2015	At least 40% 18% reduction achieved 22% off track	At least 75%	At least 90%
2. Reduce malaria case incidence globally compared with 2015	At least 40% 3% reduction achieved 37% off track	At least 75%	At least 90%
3. Eliminate malaria from countries in which malaria was transmitted in 2015	At least 10 countries On track	At least 20 countries	At least 35 countries
4. Prevent re-establishment of malaria in all countries that are malaria-free	Re-establishment prevented On track	Re-establishment prevented	Re-establishment prevented

– including, most recently, China, El Salvador, Argentina and Uzbekistan.

Measures taken to eliminate Malaria

- WHO Global Malaria Programme (GMP): It is responsible for coordinating WHO's global efforts to control and eliminate malaria. Its work is guided by the Global technical strategy (GTS) for malaria 2016–2030
- E-2025 initiative: Under this, WHO has identified group of 25 countries with the potential to eradicate malaria by 2025
- High Burden to High Impact (HBHI) initiative: In 2019, WHO has initiated the HBHI initiative in 11 high malaria burden countries, including India
- National Strategic Plan for Malaria Elimination (2017-22): It gives year wise elimination targets in various parts of the country depending upon the endemicity of malaria in the next 5 years.

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TRANS FATS

- Trans fat, or trans-fatty acids, are unsaturated fatty acids that come from either natural or industrial sources:
- Naturally occurring trans-fat come from ruminants (cows and sheep).
- Industrially produced trans-fat are found in hardened vegetable fats such as margarine and are often present in snack foods, baked goods and fried foods.
- Industrially produced trans-fats are formed in a process that adds hydrogen to vegetable oil converting the liquid into a solid, resulting in “partially hydrogenated” oil (PHO).
- Manufacturers often use them as they have a longer shelf life and are cheaper than other fats
- Intake of TFA is associated with increased risk of heart attacks and death from coronary heart disease
- In 2018, India called for action to make the country TFA free by 2022, a year ahead of the WHO global target of 2023.
- Target is to reduce TFA in all food products containing oils and fats to less than 2% in a phased manner: to not more than 3% from 1 January 2021 and not more than 2% from 1 January 2022.
- Food establishments can display the “Trans Fat Free” logo in their outlets and on their food products

What are fats and fatty acids?

Fats are a group of chemical compounds that contain fatty acids.

Fats are the **sources of energy and also act as main constituents of cellular membranes** assuring the fluidity, flexibility, permeability of the membrane.

The terms fat and fatty acids are frequently used interchangeably.

What are the different types of fatty acid?

There are two main types of fatty acids: **saturated and unsaturated**. All fatty acids are **chains of carbon atoms with hydrogen atoms** attached to the carbon atoms.

- **Saturated fatty acid** has the maximum possible number of hydrogen atoms attached to every carbon atom. It is therefore said to be “saturated” with hydrogen atoms, and all of the carbons are attached to each other with single bonds.
- **Unsaturated fatty acid**: If the carbon chain has fewer hydrogen atoms, it is said to be unsaturated. These are further divided into **monounsaturated and polyunsaturated** depending on the nature and number of bonds between carbon atoms.
 - **Omega 3 fatty acids** are polyunsaturated fatty acids (also termed as essential fatty acid) with a double bond at the third carbon atom from the end of the carbon chain. Marine algae and phytoplankton are primary sources of omega-3 fatty acids.

Are all food fats bad for the body?

- The fat in foods contains a mixture of saturated, monounsaturated and polyunsaturated fatty acids. In foods of animal origin, a large proportion of fatty acids are saturated. In contrast, in foods of plant origin and some seafood, a large proportion of the fatty acids are monounsaturated and polyunsaturated.
- Saturated and Trans fats raise LDL (or “bad”) cholesterol levels in the blood, thereby increasing the risk of heart disease. Unsaturated fats, such as monounsaturated and polyunsaturated, do not raise LDL cholesterol and are beneficial when consumed in moderation.

if the food contains less than 0.2 g of TFA per 100 g or 100 mL

SATURATED	UNSATURATED
$ \begin{array}{c} H\ H \\ \\ -C-C- \\ \\ H\ H \end{array} $	$ \begin{array}{c} H\ H \\ \\ -C-C- \end{array} $
Carbon-Carbon Single Bond	Carbon-Carbon Double Bond

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OSCAR 1 (ORBITING SATELLITES CARRYING AMATEUR RADIO)

- It was launched successfully in December, 1961, (60 years ago) and first non-governmental satellite that was built by private citizens
- It was the first satellite to reach its own orbit (low-Earth) after being ejected as a secondary payload of another primary mission.

IMAGING X-RAY POLARIMETRY EXPLORER

- XPE observatory is a joint effort of NASA and the Italian Space Agency.
- Mission will study the most extreme and mysterious objects in the universe – supernova remnants, supermassive black holes, and dozens of other highenergy objects.
- Mission's primary length is two years and the observatory will be at 600 kilometers altitude, orbiting around Earth's equator.

HIGH ENERGY PULSES FROM MAGNETARS

- A magnetar is a type of neutron star. In a typical neutron star, magnetic field is trillions of times that of the Earth's magnetic field; however, in a magnetar, magnetic field is another 1000 times stronger.
- Neutron stars are formed when a massive star (with a core between 1 and 3 solar masses) runs out of fuel and collapses, crushing together every proton and electron into a neutron.
- Magnetars suffer violent eruptions that are still little known due to their unexpected nature and short

Steps taken by WHO to eliminate Trans Fats from food supplies

WHO identified **TFA elimination** as one of the **priority targets** in its 13th General Programme of Work (GPW13). In 2018, WHO called for the **global elimination of industrially produced TFA by 2023**.

- **REPLACE action framework:** It provides a roadmap for countries to eliminate industrially produced TFA from their food supplies.

- WHO recommends that **trans-fat intake be limited to less than 1% of total energy intake** i.e., less than 2.2 g/day with a 2,000-calorie diet.

- **Additional resources to support country actions:** This include six REPLACE implementation modules and a live policy tracking map – the **TFA Country Score Card**– to monitor global progress towards the 2023 target.

- **TFA indicator** that records whether countries have adopted WHO best-practice policies for eliminating industrially produced TFA.

- This is one of the indicators in the WHO Triple Billion Indicators, an ambitious initiative to improve the health of billions of people by 2023.

- **WHO Certification Programme for Trans Fat Elimination:** The programme aims to accelerate progress towards the 2023 goal for global elimination by recognizing countries that have eliminated industrially produced TFA from their national food supplies. It also establishes country accountability.

- To qualify for certification, countries must demonstrate that a best- practice TFA policy has been implemented.

REPLACE					
REVIEW	PROMOTE	LEGISLATE	ASSESS	CREATE	ENFORCE
dietary sources of industrially-produced trans fats and the landscape for required policy change	the replacement of industrially-produced trans fats with healthier fats and oils	Or enact regulatory actions to eliminate industrially-produced trans fats	and monitor trans fat content in the food supply and changes in trans fat consumption in the population	awareness of the negative health impact of TFA among policy-makers, producers, suppliers, and the public	compliance with policies and regulations

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duration, of barely tenths of a second

- It is believed that eruptions in magnetars may be due to instabilities in their magnetosphere or to a kind of earthquakes (starquakes) produced in their crust
- These triggers create waves (called Alfvén waves) in magnetosphere of the magnetars and while interacting with each other waves dissipate energy.

GOVERNMENT PROHIBITS USE OF TB ANTIBIOTICS ON CROPS

- Ministry of Agriculture and Farmers Welfare notified the draft order on 'Prohibition of Streptomycin and Tetracycline in Agriculture'.
- The antibiotics, Streptomycin and Tetracycline are important medicines used in the treatment of tuberculosis in human beings.
- The use of antibiotics leads directly to the development and spread of resistance.
- There will be a complete ban on the use of Streptomycin and Tetracycline in agriculture from January 1, 2024.
- every State government shall take all steps necessary for the execution of the Order in their State, under the provisions of the Insecticides Act, 1968

NATIONAL OXYGEN STEWARDSHIP PROGRAMME

- government has launched an initiative to train health care workers in rational utilisation of medical oxygen to prevent wastage
- As part of the programme, at least one oxygen steward will be identified and trained in each district across the country
- They will also support audit of oxygen delivery and preparedness for a surge scenario.

GLOBAL HEALTH SECURITY INDEX (GHSI) 2021

- GHSI measures capacities of 195 countries to prepare for epidemics and pandemics.
- It was jointly released by non-profits Nuclear Threat Initiative (NTI) and Johns Hopkins Center for Health Security.
- World's overall performance on GHSI score slipped to 38.9 (out of 100) in 2021 (40.2 in 2019). India also slipped.

SCIENTISTS DEVELOPED FIRST LIVING ROBOTS THAT CAN REPRODUCE

- World's first living robots, called Xenobots, were formed from the stem cells of the African clawed frog from which it takes its name
- Xenobots are less than a millimeter wide and could move, work together in groups and selfheal.
- Stem cells are unspecialized cells that have the ability to develop into different cell types.
- Researchers used artificial intelligence (AI) to design a blueprint for organising xenobots into a new type of organism.

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- ## Potential applications of Xenobots

- To clean up plastic pollution, both in sea and on land.
To clean up plastic pollution, both in sea and on land.
To clean up plaque that causes heart blocks, or brain damage
Could be programmed to attack and remove cancer cells.

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All the Best to all my Economics students...

Hope this material will help you.

God bless...JAI Hind

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