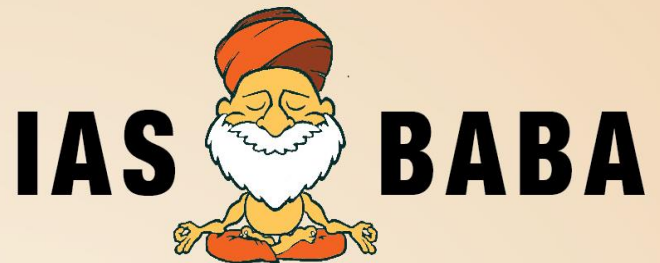




- **Infrastructure**
- **Clean and green villages**



ONLINE & OFFLINE



PRELIMS EXCLUSIVE PROGRAMME (PEP) 2024



GARIMA LOHIA

RANK 2
UPSC CSE 2022

PEP STUDENT

Most Comprehensive Prelims CLASSROOM Program

400+ Hours of Prelims Focused Classes



**1:1 Personal
Mentorship**



Solve **5000+** MCQ's
for PRELIMS 2024



**Prelims Exclusive
Handouts**



**125+ Daily Tests
& Full Length
Tests**



**PYQ Classes &
CSAT Classes by
Prelims Experts**



**Current Affairs -
Classes, Handouts
& Tests**

ADMISSIONS OPEN



Starts 6th November

INFRASTRUCTURE

A.Space Infrastructure & Recent Developments

The Indian Space Research Organization (ISRO) is one of the largest and most successful space agencies in the world. Since its inception back in 1969, the Indian space agency has achieved a number of milestones, from successfully launching Chandrayaan-2 to testing a critical technology for human spaceflight. Indian Space Research Organisation (ISRO) has come a long way since its formation from launching small rockets of just 30-70 kg payloads to carrying 4,000 kg payloads to the outer space.

Major establishments of DOS

Name	Objective	Details
Vikram Sarabhai Space Centre (VSSC)	Responsible for the design and development of launch vehicle technology.	The major programmes at VSSC include the Polar Satellite Launch Vehicle (PSLV), Geosynchronous Satellite Launch Vehicle (GSLV), Launch Vehicle Mark-3 (LVM3), Rohini Sounding Rockets, as well as the development of the Small Satellite Launch Vehicle (SSLV), Reusable Launch Vehicle (RLV), Test Vehicle Project (TVP), air-breathing propulsion, and critical technologies towards human spaceflight, Gaganyaan.
U R Rao Satellite Centre (URSC)	The lead centre for design, development, and the realisation of communication, navigation, remote sensing, scientific, and small satellite mission	Built complex and advanced satellites for various applications in areas of telecommunications, television broadcasting, VSAT services, telemedicine, tele-education, navigation, weather forecasting, disaster warning, search and rescue operations, earth observations, natural resource management, scientific, and space science, etc.
ISRO Satellite Integration and Test Establishment (ISITE)	Established in 2006, is equipped with facilities for the complete assembly and test sequence that can enable the rolling out of a flight-worthy spacecraft from the stage of a basic structure.	During the present year, all the launch complex facilities are activated and utilised to ensure a timely supply of production deliverables and precise accomplishment of activities to match the varying needs of ISRO's launch vehicle and satellite communities, as well as those of and also the Indian and foreign customers.
Satish Dhawan Space Centre (SDSC)	The Spaceport of India, is the backbone of the ISRO in providing launch base infrastructure for the Indian Space Programme.	
Liquid Propulsion Systems Centre (LPSC)	The lead centre of ISRO for the design, development, and realisation of advanced propulsion systems for launch vehicles and space propulsion systems for spacecrafts.	LPSC is vested with the responsibility of the design, development, and delivery of high-performance Space Propulsion Systems employing earth storable, cryogenic, semi cryogenic, and electric propulsion systems for ISRO's launch vehicles and satellites design, development, and realisation of flow control components and modules, advanced manufacturing and proto fabrication, as well activities in the areas of

		propulsion and sucture, are carried out by expert entities.
Space Applications Centre (SAC)	SAC, Ahmedabad, is a major research and development centre of ISRO. The core competence of the Centre lies in the development of space-borne and air-borne instruments and payloads and their applications for national development and societal benefits. These applications are in diverse areas and primarily meet the communication, navigation, and remote sensing needs of the country.	SAC designs and develops optical and microwave sensors for satellites, signal and image processing software, GIS software, and many applications for the Earth Observation programme of ISRO.
Human Space Flight Centre (HSFC)	Formed in 2019 as a lead centre for human space flight activities. HSFC undertakes multi-disciplinary R&D activities in new domains of human science and technology while conforming to high standards of reliability and human safety.	Currently concentrating on the Gaganyaan mission with a thrust on areas like end-to-end mission planning, the development of the Orbital Module, development of life support systems, selection and training of astronauts, development of various training simulators, co-ordination in recovery and rehabilitation of astronauts, collaboration with National and International agencies/institutions for multidirectional growth to act as technology aggregator.
National Remote Sensing Centre (NRSC)	Has the mandate for the establishment of ground stations for receiving satellite data, generation of data products, aerial remote sensing data acquisition, dissemination to the users, development of techniques for remote sensing applications including disaster management support, geospatial services for good governance, and capacity building for professionals, culty, and students.	
ISRO Propulsion Complex (IPRC)	Responsible for the assembly, integration, and testing of liquid propulsion systems for operational and developmental launch vehicles. IPRC is also responsible for the qualification, testing and acceptance of liquid engines, cryogenic engines, spacecraft engines, and thrusters, and provides a platform for simulation trials for interplanetary missions.	
ISRO Telemetry, Tracking and Command Network (ISTRAC)	Entrusted with the primary responsibility of providing Telemetry, Tracking and Command (TTC), and mission control services to major Launch Vehicle, Laboratory for Electro-Optics Systems (LEOS) and Interplanetary Spacecraft missions of ISRO.	Has the additional responsibility of operating the complex Ground Segment of NavIC. ISTRAC is also undertaking the development of radar systems for launch vehicle tracking and meteorological applications, providing search & rescue and disaster management services and supporting space-based services like tele-medicine, and tele-education.
Master Control Facility (MCF)	Responsible for On-Orbit Operations (OOP) and Launch & Early Orbit Phase (LEOP) operations of geostationary/ geosynchronous & IRNSS class of spacecrafts of ISRO.	Master Contro Facility (MCF) at Hassan in Karnataka, with a Geo-arc visibility of more than 140°, is an ideal control centre in the South Asian region. The facilities located at Hassan and Bhopal together now take care of GEOSAT and IRNSS class spacecrafts with payloads classified into communication, meteorological and navigational categories.

IASBABA'S YK GIST – OCTOBER 2023

ISRO Inertial Systems Unit (IISU)	IISU, Thiruvananthapuram, is responsible for the design and development of Inertia stems for Launch Vehicles and Satellites.	Major systems like Inertial Navigation Systems based on mechanical gyros and optical gyros, Attitude Reference Systems, Rate Gyro Packages, and Accelerometer Packages are developed indigenously and used in various missions of ISRO. IISU also designs and develops Actuators and Mechanisms, namely, Reaction Wheel, Momentum Wheel, Solar Array Drive, and Scan Mechanisms for spacecraft and allied applications.
Laboratory for Electro-Optics Systems (LEOS)	The lead unit for the design, development, and production of attitude sensors, high-resolution imaging optics, and special-purpose science instruments for several spacecraft. Sensor systems include Star sensors, Earth sensors, Sun sensors, Magnetic sensors, Fiber optic gyro (FOG), Temperature sensors, and MEMS-based inclinometer.	Science payloads include Laser- induced breakdown spectroscopy (LIBS), MEMS Seismometer, and specialised optics for payloads of Aditya-L1 (VELC and SUIT).
Indian Institute of Remote Sensing (IIRS)	A premier institute with a primary aim to build capacity in Remote Sensing and Geoinformatics and their applications through education and training programmes	Has enhanced its capability and evolved many training and education programmes that are tuned to meet the requirements of various stakeholders, ranging from fresh graduates to policymakers including academia, industry, and NGOs.
Development and Educational Communication Unit (DECU)	Established in 1983, DECU, located in Ahmedabad, has been the focal unit of ISRO for the implementation of satellite-based societal applications in the country. DECU is mainly involved in the system definition, planning, implementation, and social research & evaluation of such applications.	The unit has been responsible for the conceptualisation and demonstration of many societal applications of satellite communications.
Physical Research Laboratory (PRL)	An autonomous unit of DOS, and a premier research institute engaged in basic research in the areas of Astronomy and Astrophysics, Solar Physics, Planetary Science and Exploration, Space and Atmospheric Sciences, Geosciences, Theoretical Physics, Atomic, Molecular & Optical Physics and Astro-chemistry.	Carry out research, publish scientific papers, and develop appropriate instrumentation to enable their specific science goals.
National Atmospheric Research Laboratory (NARL)	Located at Gadanki near Tirupati, is an autonomous organisation engaged in cutting- edge research in atmospheric and space sciences with the vision of developing capability to predict the behaviour	Provides high-resolution data on upper air winds and weather forecasts supporting rocket launches from SDSC SHAR. NARL has a vibrant research programme, capacity building, and public outreach activity.

IASBABA'S YK GIST – OCTOBER 2023

	of the earth's atmosphere through observations and modelling.	
North Eastern-Space Applications centre (NE-SAC)	An autonomous organisation under the DOS and is a joint initiative of DOS and the North Eastern Council (NEC). The centre has the mandate to provide space-based support in governance and development by taking up projects in the fields of natural resources management, infrastructure planning, healthcare, education, emergency communication, disaster management support, atmospheric science research, etc.	Conducts training and capacity building in the field of geospatial technology and unmanned aerial vehicle-based remote sensing applications. The Centre coordinates with the State Remote Sensing Application Centres of the North Eastern Region (NER) and acts as a nodal centre for the implementation of major national and regional programmes requiring space-based inputs.
Indian Institute of Space Science and Technology (IIST)	Asia's first Space University, was established at Thiruvananthapuram in 2007 to offer high-quality education in space science and technology to meet the demands of the Indian Space Programme.	IIST fosters state-of-the-art research and development in space studies and provides a think-tank to explore new directions for the Indian Space Programme.
Antrix Corporation Limited (ACL)	Engaged in providing space sector products and services worldwide ranging from supply of hardware and software, earth observation and scientific missions, remote sensing data services, transponder lease services, launch services, mission support services, and other allied services.	
Space India Limited (NSIL)	Got incorporated in 2019, as a wholly-owned Government of India Undertaking/Central Public sector Enterprise (CPSE), under the administrative control of the DOS. NSIL has been categorised as Schedule 'A' CPSE by the Dept. of Public Enterprises (DPE) in 2020.	
Indian National Space Promotion and Authorization Centre (IN-SPACe)	As the space sector was opened up to private enterprises and startups to undertake space activities to promote, handhold, regulate, and authorise their activities, an independent nodal agency under DOS, the Indian National Space Promotion and Authorization Centre (IN-SPACe) was formed. This will enhance the diffusion of space technology and boost the space economy within the country. IN-SPACe permits and oversees the activities of private enterprises and startups.	It regulates space activities, including the building of launch vehicles and satellites and providing space based services as per the definition of space activities. It permits the sharing of the space infrastructure of ISRO and the establishment of temporary facilities within the premises of ISRO.

Chandrayaan 3 – India's Successful Lunar Mission



Chandrayaan-3 is the successor to the Chandrayaan-2 mission.

- **Launch Vehicle: Mark-III (LVM3).**
- **Launched site: Satish Dhawan Space Centre (SDSC), Sriharikota, Andhra Pradesh.**
- **Composition:** It consists of an indigenous Lander module (LM), a Propulsion module (PM), and a Rover.
 - **Lander:** a spacecraft that descends towards and comes to rest on, the surface of an astronomical body.
 - **Propulsion module:** a box-like structure, mounted with a large solar panel on one side and a large cylinder on top.
 - **Rover:** a small vehicle that can move over rough ground, often used on the surface of other planets, sometimes controlled from the earth.
- The Lander and the Rover have scientific payloads to carry out experiments on the lunar surface.
- There will not be any orbiters like [Chandrayaan 2](#) in it.

Objectives of Chandrayaan-3 mission:-

- To demonstrate a Safe and Soft Landing on the Lunar Surface.
- To demonstrate Rover roving on the moon.
- To conduct in-situ scientific experiments.

Lander payloads:-

- **Chandra's Surface Thermophysical Experiment (ChaSTE):** to measure the thermal conductivity and temperature
- **Instrument for Lunar Seismic Activity (ILSA):** for measuring the seismicity around the landing site
- **Langmuir Probe (LP):** to estimate the plasma density and its variations.
- A passive Laser Retroreflector Array from NASA is accommodated for lunar laser ranging studies.

Rover payloads:-

- **Alpha Particle X-ray Spectrometer (APXS) and Laser Induced Breakdown Spectroscopy (LIBS):** for deriving the elemental composition near the landing site.

Propulsion Module Payload:-

- **Spectro-polarimetry of Habitable Planet Earth (SHAPE):** Future discoveries of smaller planets in reflected light would allow us to probe into a variety of Exo-planets which would qualify for habitability or for the presence of life.

About GSLV-Mk III:-

- **Weighs: 641 tones.**
- **Capacity:** GSLV can take 10,000-kg satellites to lower earth orbits.
- It is also known as the **Launch Vehicle Mark 3 (LVM3).**
- It is a **three-stage vehicle.**
 - It has two solid motor strap-ons, a **liquid propellant core stage, and a cryogenic stage.**
- It is the **heaviest and the shortest** among India's operational launch vehicles.

What happened to Chandrayaan-2?

- Chandrayaan-2, India's second mission to the Moon, had failed to make a soft-landing on the lunar surface.
- The lander and rover malfunctioned in the final moments and crash-landed, getting destroyed **in the process**

Key information gathered till now

- Presence of water molecules on moon which is the most precise information about water till date.
- Presence of Minor elements: Chromium, manganese and Sodium have been detected for the first time through remote sensing.
- Information about **solar flares**: A large number of microflares outside the active region have been observed for the first time. It shall help in understanding the mechanism behind heating of the solar corona.

Voyage to Study the Earth's Sun

The Sun

Our Sun is the nearest star and the largest object in the solar system. The estimated age of sun is about 4.5 billion years.

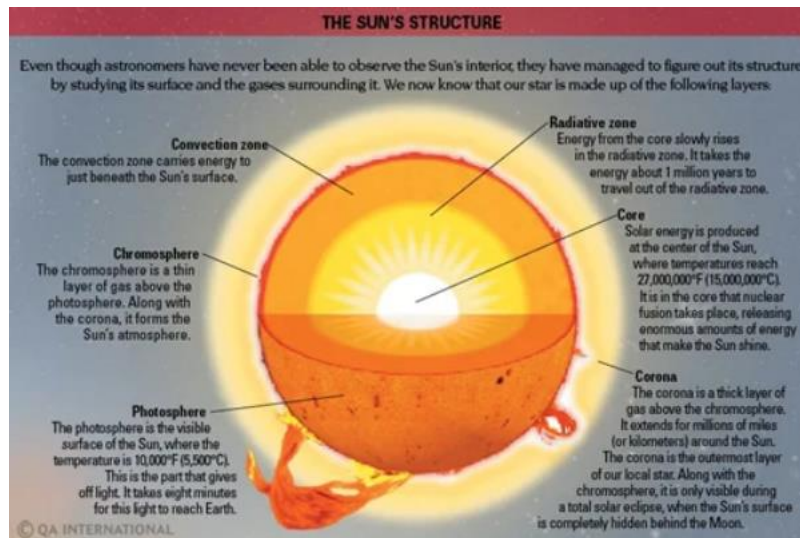
- It is a hot glowing ball of hydrogen and helium gases.
- The distance to the sun from the Earth is about 150 million kilometres, and is the source of energy for our solar system. Without solar energy life on earth, as we
- know, cannot exist.
- The gravity of the sun holds all the objects of the solar system together.
- At the central region of the sun, known as 'core the temperature can reach as high as 15 million degrees Celsius. At this temperature, a process called **nuclear fusion** takes place in the core which, powers the Sun.
- The visible surface of the sun known as the **photosphere** is relatively cool and has temperature of about 5,500°C.

Why study the Sun?

To study the radiations that do not reach the Earth's surface

To understand the contribution of polar dynamics and magnetic fields to solar cycles

Further, the polarisation measurements of solar radiations at different wavelengths are required to understand the various processes occurring in and around the sun.



About Aditya-L1 Mission:

- Aditya-L1 is the **first observatory-class space-based solar mission** from India.
- A satellite around the **L1 point** has the major advantage of **continuously viewing the Sun without occultation/eclipses**.
- This position provides a greater **advantage of observing solar activities continuously**.
- Aditya-L1 carries seven payloads to observe the **photosphere, chromosphere, and the outermost layers of the Sun (the corona)** using electromagnetic and particle detectors.
- Four payloads directly view the **Sun from the unique vantage point of L1**, and the **remaining three payloads carry out in-situ studies of particles and fields at the Lagrange point L1**.
- The Aditya-L1 mission will be inserted in a **halo orbit around the L1 point, which is about 1.5 million km from Earth**.

Aditya L1 Payloads: The 1,500 kg satellite carries seven science payloads with diverse objectives.

- **Visible Emission Line Coronagraph (VELC):** To study the diagnostic parameters of solar corona and dynamics and origin of Coronal Mass Ejections, magnetic field measurement of solar corona.
- **Solar Ultraviolet Imaging Telescope (SUIT):** To image the spatially resolved Solar Photosphere and Chromosphere in near Ultraviolet (200-400 nm) and measure solar irradiance variations.
- **Aditya Solar wind Particle Experiment (ASPEX):** To study the variation of solar wind properties as well as its distribution and spectral characteristics.
- **Plasma Analyser Package for Aditya (PAPA):** To understand the composition of solar wind and its energy distribution
- **Solar Low Energy X-ray Spectrometer (SoLEXS):** To monitor the X-ray flares for studying the heating mechanism of the solar corona .
- **High Energy L1 Orbiting X-ray Spectrometer (HEL1OS):** To observe the dynamic events in the solar corona and provide an estimate of the energy used to accelerate the particles during the eruptive events.
- **Magnetometer:** To measure the magnitude and nature of the Interplanetary Magnetic Field.

Lagrange Points

Lagrange points are positions in space where objects sent there tend to stay put.

- At Lagrange points, the gravitational pull of two large masses precisely equals the centripetal force required for a small object to move with them. These points in space can be used by spacecraft to reduce fuel consumption needed to remain in position.
- Lagrange Points are positions in space where the gravitational forces of a two body system like the Sun and the Earth produce enhanced regions of attraction and repulsion. These can be used by spacecraft to reduce fuel consumption needed to remain in position.

B. Getting Smarter about Road Infrastructure

Roads, both in number and quality, have been an important driver for economic development and social inclusion. In the recent three decades, the emphasis has been more on quality, leading to better speeds and all-weather connectivity. Various organisational innovations and technologies have enabled this.

The road infrastructure of India is classified into six categories. The road length in kilometers (km) of each of these categories and its compound annual growth rate (CAGR) in percentage over 1991, available most recently as of 31st March 2019, as per the 2022-23 annual report of the Union Ministry of Road Transport and Highways (MoRTH) is shown in the table below.

National Highways (NH)	State Highways (SH)	District Roads	Rural Roads	Urban Roads	Project Roads	Total
1,32,499	1,79,535	6,12,778	45,22,228	5,41,544	3,43,163	63,31,757
5.02	1.24	0.66	4.67	3.87	1.77	3.64

Pradhan Mantri Gram Sadak Yojana (PMGSY)

- **Launched on:** 25th December, 2000.
- **Objective:** To provide connectivity, by way of an all-weather road to unconnected habitations.
- **Eligibility:** Unconnected habitations of designated population size (500+ in plain areas and 250+ in North-Eastern States, Himalayan States, Deserts and Tribal Areas as per 2001 census) in the core network for uplifting the socio-economic condition of the rural population.
- **Construction of Rural Roads:** The Rural Roads constructed under the PMGSY will be in accordance with the provision of the Indian Roads Congress (IRC).
 - IRC is the Apex Body of Highway Engineers in the country.
 - The IRC was set up in 1934.
- **Challenges:**
 - Lack of dedicated funds.
 - Limited involvement of the Panchayati Raj Institutions.
 - Inadequate execution and contracting capacity.
 - Less working season and difficult terrain particularly in Hill States.
 - Scarcity of the construction materials.
 - Security concerns particularly in Left Wing Extremism (LWE) areas.
- Has been one of the more successful projects in India and can be attributed to three reasons:
- Selection of villages for connectivity based on objective criteria
- Overseeing from independent agencies, including the World Bank
- Housing the project under the Ministry of Rural Development (demand side) rather than the MoRTH (supply side). The PMGSY has also spun off projects like the Mukhya Mantri Gram Sadak Yojana (MMGSY) in many states that want faster development of rural roads.

- An **Unconnected Habitation** is one with a population of designated size located at a distance of at least 500 metres or more (1.5 km of path distance in case of Hills) from an All-weather-road or a connected Habitation.
- **Core Network:** It is that minimal Network of roads (routes) that is essential to provide Basic access to essential social and economic services to all eligible habitations in the selected areas through at least single all-weather road connectivity.
- Gramin Agricultural Markets (GrAMs): GrAMs are retail agricultural markets in close proximity to the farm gate, that promote and service a more efficient transaction of the farmers' produce.

Bharatmala Pariyojana

- It is an umbrella program for the highways sector.
- **Initiated by:** Ministry of Road Transport and Highways.
- **Objectives:** (1) To optimise the efficiency of freight and passenger movement across India by bridging critical infrastructure gaps through effective interventions; (2) To generate a large number of direct

and indirect employment opportunities in the construction and infrastructure sector; (3) To connect 550 districts in the country through national highway linkages.

- **Effective measures:** Development of economic corridors, inter corridors and feeder routes, national corridor efficiency improvement, border and international connectivity roads, coastal and port connectivity roads and Greenfield expressways.
- **Features:**
 1. Improvement in the efficiency of existing corridors through the development of Multimodal Logistics Parks and elimination of chokepoints
 2. Improving connectivity in North East and increasing harmony with Inland Waterways
 3. Emphasis on the use of scientific and technological planning
 4. Satellite mapping of corridor
 5. Delegation of powers for successful completion of Phase I by 2022.

Do you know?

- **Economic Corridors:** These are integrated networks of infrastructure within a geographical area designed to stimulate economic development.
- **Greenfield Projects:** They lack constraints imposed by prior work on the site. Typically, it entails development on a completely vacant site and architects start completely from scratch.
- **Brownfield Projects:** They carry constraints related to the current state of the site and might be contaminated or have existing structures that architects have to tear down or modify in some way before the project can move forward.
- **Multimodal Logistics Parks:** These are a key policy initiative of the Government of India to improve the country's logistics sector by lowering overall freight costs, reducing vehicular pollution and congestion, and cutting warehousing costs.
- **Chokepoint:** It is a single point through which all incoming and outgoing network traffic is funnelled and hence, leads to congestion and traffic.



Infrastructure Investment Trusts (InvIT)

- InvITs are instruments that work like mutual funds.
- They are designed to pool small sums of money from a number of investors to invest in assets that give cash flow over a period of time. Part of this cash flow would be distributed as dividend back to investors.
- InvITs are listed on exchanges just like stocks — through IPOs.
- The InvITs listed on the stock exchange are IRB InvIT Fund and India Grid Trust.

- InvITs are regulated by the Securities and Exchange Board of India (SEBI) (Infrastructure Investment Trusts) Regulations, 2014.
- Real Estate Investment Trusts (REITs) are similar to InvITs but they are present only in Real estate sector.
- For a dedicated peer group, Motivation & Quick updates, Join our official telegram

About NHAI InvIT:

- The infrastructure investment trust is sponsored by National Highway Authority of India (NHAI) to support Government of India's National Monetization Pipeline.
- It will have minimum investment amount at Rs.10,000 and will be open to institutional investors, non-institutional investors, high-net-worth individuals, and retail investors including the common man.
- NHAI launched its InvIT to facilitate monetisation of roads and also to attract foreign and domestic institutional investors to invest in the roads sector.
- The advantages of an InvIT instrument are that it has stable and predictable cash flows and experienced professionals manage the InvIT and operate and maintain the roads.

Miscellaneous:

- NHAI has the largest share under the National Monetization Pipeline at 27%.
- Such government initiatives will bring logistics cost down from 13-14% to 5% of GDP.

Highway development leads to positive spillover effects

Highways are the arteries through which the economy pulses. By linking producers to markets, workers to jobs, students to school, and the sick to hospitals, roads are vital to any development agenda. Across the world, highways are seen as drivers of economic growth. They connect cities, transport goods, and help bring people together. Roads such as the national expressway and Golden Quadrilateral in India have had enormous positive spillover effects on regional and national development.

A highway is the main public road that connects different cities, towns and at times, villages etc. together. It is a major and significant public road that is able and fit to carry fairly heavy traffic. Substantial investments on road infrastructure developments by the government at different levels e.g. federal, state, and local government are also frantic efforts to attracting investors that will promote the economy.

Positive effects of highways:

- **Reduced costs-** Highway network enhances transport system and reduces transportation costs and this, in turn, reduces production costs while increasing the productivity and profitability of organizations.
- **Promote industrialisation-** Industries and highways often exist in pair. Industries can avail better logistic facilities through good highway network.
- **Connectivity-** Network of highways interlinked with state and district roads connect the distant and remote locations with each other.
- **Enhance trade-** Highways can relatively reduce travel time to villages, cities and towns thereby encourage people to travel for business and trade.
- **Reliability-** Highways make transportation schedules and deliveries more reliable and timely.
- **Increase exports-** Better connectivity to ports through highways increases economic activity and exports of a country.
- **Employment generation-** Highway construction and associated ancillary industries create employment opportunities in the area.
- **Regional growth-** It has been observed that a greater economic activity is found near highways and thus results in the growth of the respective region.
- **Social capital-** Highways also contribute immensely to social growth, relatives are able to visit their loved ones more often and it enhances good relationships between family and friends.

India has implemented two major schemes to improve highways, they are Pradhan Mantri Gram Sadak Yojana and Golden Quadrilateral. India also witnessed the above-mentioned positive spillover impacts like:

- Small and large towns have crop up on the major routes, not just along the national highway but also along other major roads i.e. State highways and rural roads. The rise of cities such as Ankleshwar, Pali, and Khopoli is mainly due to national highways.
- The 1% increase in density in a region close to the highway road, and also leads to about a 0.8% increase in its neighbouring region's density. For example, the creation of the Mumbai- Pune expressway led to development of satellite towns such as Pimpri Chinchwad, Aundh etc.
- There are spillovers in activity from one region to its neighbour. The development in commercial hubs such as Pune, Bangalore gives rise to MSME industries in neighbouring areas.
- In the two decades, since the early 1990s, regions along the transit networks are the first to develop, after which activity spreads to their neighbours, and then their neighbors' neighbors. Thus, the path taken by the road determines the geographic spread of economic activity across the country.
- As early as 1992, one can see areas along the national highway seem to be more developed than those further away. This is especially true for regions closer to Mumbai, and then the portion between Bangalore and Chennai. By 1997, the region on the road between Mumbai and Bangalore developed, and activity spread to regions adjacent to the places that were rich in 1992, highlighting the pattern of spillovers.
- Access to better infrastructure, therefore, can have significantly large impacts on the overall development of the region. It improves health care, education, migration and cultural exchanges as well.

However, there are various negative consequences of highway development too:

- **Destruction of habitats:** This has been seen in highways being carved out of mountains in tunnel forms. It makes the terrain fragile, especially in landslide-prone regions of Western Ghats and Himalayas
- **Loss of Natural Resources** due to road development.
- **Loss of Access to Common Property:** Many farmers lose some of the most productive lands to highways development. This affects their livelihood. Also, many landless labourers who were dependent upon agriculture were uprooted.
- **Displacement:** Tribal displacements due to highways and Dams have been a consanguinity theme in Indian development history. For example: the Bhil tribe was displaced due to the Jaipur Ajmer highway.

Development of Highways brings multiple socio-economic benefits to the urban and rural areas which form a strong base of the National economy and it is a powerful instrument for the socio-economic transformation of the cities and villages. Further to avoid negative externalities such as displacement and loss of productive land there is need for better Impact assessment studies.

Enhancing the border road infrastructure has its economic and strategic advantages for India

India is a unique country with ~15000 km of land border sharing with seven countries. All of this border comprised of unique topography, culture and varied socio-economic challenges. Considering unity of the nation and neighbourhood first policy of India, it is imperative to develop modern and competitive border road infrastructure.

Economic Advantages of Border Road Infrastructure:

- One of the most important advantages is the development of legal and amicable trade relations with neighbouring countries. Examples of it are trade through Attari-Wagha border and Border Haats with Bangladesh and many more with Nepal, Bhutan, etc.
- Proper border road infra will reduce trafficking and smuggling, which is currently a big cause of concern for India and neighboring countries.
- Recently, World Bank has released a report and according to its findings intra-regional trade accounts for a little more than 5 percent of South Asia's total trade while it accounts for 50 percent of total trade in East Asia. It means there is huge untapped regional trade potential in South Asia, where most of the countries share borders with India.
- Another major economic benefit is inclusive growth and development. Border road infrastructure, especially in harsh terrains such as the northeast and Jammu & Kashmir provides an avenue for self-employment and boost to traditional small-scale Industries.

- Furthermore, tourism in beautiful and lofty Himalayas has not reached to its full potential due to improper road infrastructure. To tap the full potential of natural tourism avenues we must further improve our border road infra.

Strategic Advantages of Border Road Infrastructure

- One of the major advantages is that through border road infra India will be successful in pushing for her ambitious neighbourhood first and act east policies. It will act as soft power in terms of creating people-to-people contacts. The best example of this is the most recent project of Kartarpur Corridor.
- Border road infra helps in maintaining peace and stability by controlling the security concerns related to inter-region and intra-region issues.
- The task of national integration which started with the independence of India and still going on will be incomplete without border road infra. Connectivity and inclusivity are important tools for national integration of far-flung areas such as Northeastern states and Ladakh, etc.
- Economic avenues provided by such infra definitely lead to strategic benefits within and outside the country to control the menace of terrorism and secessionists' activities.
- Another important advantage of border roads is proper and swift disaster management. The difficult and harsh terrains of Indian borders and the relatively low development of bordering countries make it inevitable for India to be prepared and self-sufficient to handle any kind of disaster.

Challenges ahead:

- Rough and difficult terrain
- Weather and Climatic conditions
- Seismically active areas in most of the border
- Ceasefire violations and border intrusions
- Inadequate manpower, and funds with Border Road Organisation (BRO)
- Red tapism and bureaucratic delays in projects

BRO has been frequently in the news due to delays and other lacunae with regard to border road infra. Proper and defined autonomy with respect to **3F: Funds, Functions, and Functionaries** will help to boost the rapid development of border road infra, ultimately leading to economically integrated and strategically amiable South Asia.

India in geostrategic location

- **Strategic location of the region:** Countries of this region share borders with China, Afghanistan, Russia and Iran. Tajikistan is located in proximity to the Pakistan-occupied Kashmir. This region is seen as a Eurasian bridge, connecting countries of Asia to Europe.
- **India-Pakistan:** Pakistan has a geostrategic location in South Asia where it will use Gwadar Port as a major trade route and a future trade hub. The importance of the China-Pakistan Economic Corridor (CPEC) and with it the Belt and Road Initiative, also known as the One Belt One Road or the Silk Road Economic Belt
- **India- China:** One is Aksai Chin, a virtually uninhabited high-altitude desert expanse of about 37,000 square kilometres. Aksai Chin lies between the Indian state of Jammu and Kashmir, and China's Xinjiang province, both regions that are also riven by separatist conflicts. On the other side, Arunachal Pradesh, a diversely populated hill region with a population of around 1.4 million people spread out over 84,000 square kilometres is also a geostrategic location.
- **India- Nepal:** holds a significant geopolitical position in the Himalayan region of the South Asia due to its geostrategic location acting as a buffer state between the two Asian giants- India and the China.
- **India- Bhutan:** It is sandwiched between two powerful nations, India and China. Because of its proximity to both the countries. India, is a close neighbour, has traditionally played a significant role in Bhutan. On the other hand Doklam plateau is an area with a plateau and a valley which lies on the Bhutan-China border, near India.
- **India-Myanmar:** The Kaladan Multi-Modal Transit Transport Project will connect the eastern Indian seaport of Kolkata with Sittwe seaport in Myanmar by sea. Major strategic and commercial transport route connecting North-East India, and South Asia as a whole, to Southeast Asia

- **India- Bangladesh:** Lying between the Himalayas in the north and the Bay of Bengal in the south, it offers the only land route connecting the two regions. Any invasion into South Asia from the East must pass through Bangladesh. Bangladesh's close proximity to both India and China adds further to its geographic importance.

C. Rail Infrastructure

The railways in India provide the principal mode of transportation for freight and passengers. It brings together people from the farthest corners of the country and makes possible the conduct of business, sightseeing, pilgrimage and education. The Indian Railways have been a great integrating force for more than 167 years. It has bound the economic life of the country and helped in accelerating the development of industry and agriculture.

From a very modest beginning in **1853**, when **the first train steamed off from Mumbai to Thane**, a distance of 34 kms, Indian Railways have grown into a vast network of 7,308 stations spread over a route length of 68,043 km with a fleet of 13,215 locomotives, 74,744 passenger service vehicles, 10,103 other coaching vehicles and 3,18,896 wagons. The growth of Indian Railways in the 167 years of its existence is thus phenomenal. It has played a vital role in the economic, industrial, and social development of the country. The network runs multi-gauge operations extending over 68,043 route kilometers.

Major developments

- The research and development (R&D) wing of Indian Railways is the **Research Design and Standards Organization (RDSO)** at Lucknow. It acts as a consultant in technical matters to Indian Railways, and other organisations connected with railway manufacturing and design.
- **Railway Finance:** Owing to the Separation Convention of 1924, a separate railway budget was presented from 1924-25, even though it was part of the overall budget of the Government of India.
 - The Railway Budget has been **merged with the general Budget from Budget Year 2017-18:**
 - Instead of 16 demands for grants, the Union Ministry of Finance has introduced **one demand for grants for the Ministry of Railways.**
- **Railway Electrification:** Increasing railway electrification under the Ministry of Railways' Mission 100% Electrification policy will not only help reduce the country's crude oil imports but also has environmental benefits. It increases average speeds, and loadings for both freight and passengers, thereby, providing the opportunity for modernisation.
- **Rail Tourism:**
 - Indian Railways (IR) has introduced the **Bharat Gaurav Trains Policy** to showcase cultural heritage and historical places of India to both domestic and foreign audiences with the help of tourism sector professionals and other service providers.
 - Specialised tourism products are also introduced from time to time in association with IRCTC and states.

National Rail Plan (NRP)

- NRP for 2030 has been prepared by IR to create a 'future ready' railway system by 2030.
- It aims to formulate strategies based on both operational capacities and commercial policy initiatives to increase the modal share of the Railways in freight to 45% and to sustain it.
- The creation of capacity ahead of demand to cater for future demand growth right up to 2050 is the objective of NRP.
- To achieve this objective all possible financial models including Public Private Partnership (PPP) are being considered.

Rail Kaushal Vikas Yojana (RKVY)

- This is a skill development programme, where training will be provided to youth with a special focus on jobs that are relevant to the Railways.

- The training will be provided in four trades viz. Electrician, Welder, Machinist and Fitter and other trades will be added by zonal railways and Production units based on regional demands and needs assessment.
- Training will be provided to apprentices under the Apprentice Act 1961.
- **Objectives:**
 - To impart training skills to the youth in various trades to bring qualitative improvement.
 - To train 50,000 candidates over the next three years.
- **Eligibility:** Candidates who are 10th passed and between 18-35 years shall be eligible to apply.
- **Significance:** It will not only improve the employability of the youth but also upgrade the skills of employed.

Vande Bharat Express Trains

- IR has launched India's first indigenous semi-high-speed train Vande Bharat Express as part of efforts under 'Make in India'.
- The first Vande Bharat Express train was flagged off on 15th February 2019, on the New Delhi-Kanpur-Allahabad-Varanasi route.
- They have been introduced to upgrade maintenance technologies and methodologies and achieve improvement in productivity and performance of all railway assets and manpower which would cover reliability, availability, utilisation, and efficiency.
- The train will have higher battery back up of three hours and a better flood level.
- It will also offer wifi-enabled content on demand.
- The trains will be pre-fitted with the Kavach (the indigenously-developed train collision avoidance system).

Kavach Train Protection Scheme

- It is India's very own automatic protection system in development since 2012, under the name Train Collision Avoidance System (TCAS), which got rechristened to Kavach or "armour".
- Simply put, it is a set of electronic devices and Radio Frequency Identification devices installed in locomotives, in the signalling system as well the tracks that talk to each other using ultra high radio frequencies to control the brakes of trains and also alert drivers, all based on the logic programmed into them.
- It continuously refresh the movement information of a train, it is able to send out triggers when a loco pilot jumps signal, called Signal Passed at Danger (SPAD), a grave offence in railway operations with respect to safety, and the key to accidents like collision.
- The devices also continuously relay the signals ahead to the locomotive, making it useful for loco pilots in low visibility, especially during dense fog.
- TCAS or Kavach includes the key elements from already existing, and tried and tested systems like the European Train Protection and Warning System, and the indigenous Anti Collision Device.
- The current form of Kavach adheres to the highest level of safety and reliability standard called Safety Integrity Level 4.
- It will also include stationary equipment to gather signalling inputs and relay them to a central system to enable seamless communication with the train crew and stations.
- Over 13,000 train accidents in 2020, 32 lives lost daily on average as per NCRB report. With this type of protection system trains collision with other train can be reduced.

D. Port Infrastructure

From economic and strategic point of view, port development is a vital component of India's infrastructure priorities.

According to the Ministry of Shipping, around 95 per cent of India's trading by volume and 70 per cent by value is done through maritime transport. India is the sixteenth largest maritime country in the world, with a coastline of about 7,517 km. The Indian ports and shipping industry plays a vital role in sustaining growth in

the country's trade and commerce. Thus, ports development have both strategic and economic implications for India.

India has 12 Major Ports, administered by the Central Government, and around 200 notified Non-Major Ports, administered by the State Governments. In 2014-15, out of the 200 Non-Major Ports, 69 ports were reported to have handled cargo traffic. The infrastructure sector, particularly the Maritime Sector, is expected to grow significantly with the increase in international and domestic trade volumes.

Considering the objective on US \$5 trillion economy, ports have an instrumental role to play. They constitute both strategic as well as economic significance.

Economic Significance

- **Port development and modernization:** New port infrastructure like better handling capacity, modernization etc will help improve the turnaround time of ships (From 2015-16 to 2017-18, it was reduced by 25%).
- **Infrastructure:** The development of new infrastructure like new ports, road connectivity to ports, coastal economic zones (CEZs), multi-modal logistics parks etc will provide new infrastructure to handle more cargo which will be needed in the future.
- **Reduced logistics cost-** At present, logistics cost in the country is in the range of 14-16 percent against 8-10 percent in other countries. Ex: The project Sagarmala can help reduce these costs. This will help in improving exports and increasing the speed of trade.
- **Inter-connectivity:** It leads to interconnection between roadways, railways, waterways and airways, thus reducing the overall cost of transportation as well as improving connectivity.
- **Employment:** Provides employment opportunities to coastal area people and increases their standard of living. It is estimated to create an estimated 10 million new jobs (four million in direct employment).
- **Development:** This will help in the development of regions around ports by increasing investment, new sectors presence like manufacturing, services etc. The cities like Kolkata, Chennai, and Mumbai owe a great deal to the presence of large ports. Similarly, new ports can lead to new cities being developed.
- **Efficiency:** Will reduce the cost of transportation and make India a new transit hub. Developing rivers as inland waterways can also help save domestic logistics costs. India has been investing in inland transportation over the past few years. This will help in reducing the load on railways and increase profits as it's a cheaper mode of transportation. Project Unnanti is focused on increasing the efficacy of existing ports.
- **Export competitiveness-** Ports could help the country and industries to gain a competitive advantage compared to its neighbours. It is expected to boost India's merchandise exports to \$110 billion by 2025
- **Power sector-** The project aims to shift the movement of coal to the coastal route, which would cut down electricity costs by up to 35 percent, especially for coastal power plants in Andhra Pradesh and Karnataka, which receive coal by rail networks.
- **Blue economy:** Developed coastal infrastructure, livelihood development of coastal communities, exploitation of ocean resources will help improve India's Blue economy.
- **FDI:** It will also help in attracting foreign container companies to set up their facilities.

Strategic Significance

Strong port infrastructure is necessary for securing India's strategic policy objective of Security and Growth for All in the Region (SAGAR). India provided COVID-19 relief materials to the Seychelles, Comoros, Maldives, and Madagascar under mission Sagar through INS Kesari.

- **Ensure the security of strategic installations:** Port development will result in the development of India's coasts, which are home to a number of strategic installations such as naval bases, nuclear power plants, and satellite and missile launching ranges.
- **Curtailing transnational organized crime at sea:** India is vulnerable to narcotic drug trafficking because it is between the world's two main opium-producing regions, the Golden Crescent (Iran, Afghanistan, and Pakistan) to the west and the Golden Triangle (Myanmar, Thailand, and Laos) to the east. Such illegal practices would be curtailed by port expansion and proper management of port resources, ensuring the safety of communication sea lanes (SLOC).

- **Regional integration:** South Asia is one of the least integrated regions in the world, and India's eastern seaboard can help recreate an integrated hub and spoke model for regional connectivity in the Bay of Bengal.
- **Role in securing objective of Net Security Provider for Indo-Pacific region:** India has provided security to countries in the Indian Ocean in the past. Operation Cactus which thwarted the efforts of rebels to capture Maldives in the 1990s was one such mission. Many western countries are hedging on India's ability to counter China in the IOR. India could hedge on their support to realize its ambition of Net Security Provider in the IOR by enhancing its coastal security and ensuring port modernizations and its connectivity with the hinterland.
- **Ensuring influencing naval presence** to enable free sea lines of communication (SLoC). The growing dominance of China in the Indian Ocean needs to be countered through strong infrastructure in the region. The development of a strategic command center at Andaman and Nicobar is part of the initiative.
- **Countering the influence of China:** China has aggressively exacerbated India's pre-existing Sri Lanka-linked trans-shipment problem through its Belt and Road Initiative. China holds a 99-year lease on Sri Lanka's Hambantota port. As a result, port expansion and local trans-shipment facilities are critical strategic requirements for India.
- **ASEAN-** With increasing ties with ASEAN countries, the importance of ports and port infrastructure further increases and Sagarmala can help address it.
- **Relief measures:** Ports can also use these capabilities to support emergency relief activities.
- **Environment:** The Indian Ocean is warming three times faster than the Pacific Ocean. Overfishing, coastal degradation, and pollution are also harming the marine ecosystem. Hence, good design and sound environmental impact management of construction and operational activities of the port are critical.

Challenges faced by the Port infra in India:

- **Infrastructure Bottleneck:** Indian ports are plug with the lack of capacity and low productivity. The high turnover time and freight costs make Indian ports less competitive.
- **Logistics Bottleneck:** The port productivity and efficiency also depend upon the quality and reliability of road and rail connectivity, and adequate storage and handling facilities.
- **Technology Bottleneck:** Major international ports are using advanced innovations and information technology to change the way goods are transported between port terminals.

Maritime security and port infrastructure will play a vital role in achieving a robust economic growth and strategic upper hand in the IOR. Thus, the Government has to support the development of world-class port infrastructure in India to make Indian ports globally competitive.

Significance Of Highways and Waterways for Agricultural Supply Chains In India

For the distribution of agricultural items, road transport has a crucial role to play as it is the chief means of transporting agricultural goods from farms to local markets and also to several urban locations.

- Rivers are natural highway which does not require any cost of construction and maintenance carrying agricultural goods at large scale in the Ganges and Brahmaputra rivers has huge potential.
- Both road and water route infrastructure support producers, agripreneurs, and agricultural micro, small and medium enterprises (MSMEs) in their production value chain are central to the transition.
- Better transportation services generate improved agricultural income as well as fruitful employment. A planned network of roads helps to minimize transport cost, boost the delivery of farming material and improve special agricultural production as well as distribution.
- With effective road and water route highways agricultural markets, APMC, warehouses, food processing units and cold storage can be integrated for the national agriculture market will be beneficial for e-NAM and e-commerce in both B2B and B2C markets.
- Hence, if the road services in the rural areas are good, it will greatly impact the farmers' productivity, employment, and income and also decrease poverty. Therefore, need to build robust road infrastructure from the existing SCM of agriculture.

Current poor transportation and lack of multi-modal linkages lead to delay in procuring perishable items and thus lead to losses:

- National highways in India account for only 2% of the total road network but transport 40% of all cargo. Although waterways capacity is increasing, a lack of connectivity to these ports causes cost increases and delays in the transfer of goods.
- Most roads in the rural areas are Kutcha (bullock-cart roads) and become useless in the rainy season. Under these circumstances, the farmers cannot carry their produce to the main market and are forced to sell it in the local market at low prices.
- If transport services are not common, cheap quality, or costly then agriculturalists will be at an inconvenience when they try to sell their crops. An expensive service will naturally lead to low farm gate prices (the net price the farmer receives from selling his produce).
- The seasonally blocked routes or sluggish and irregular transport services, together with unsatisfactory storage, can actually lead to high losses as specific items such as milk, fresh vegetables, and tea, get worse quickly after a while.
- In case the agricultural products are moved through a bumpy road network, then several other crops such as mangoes & bananas might also suffer losses from staining. This also shows up in reduced rates to the agriculturalist.

The supply chain in agriculture is affected by several issues owing to the infrastructure deficit. The government needs to build capacity with warehousing, cold storage, packaging, metalled or pucca roads with efficient transport systems to reduce the distress of farmers.

IAS BABA

Integrated Learning Program (S-ILP) - 2024

Crack UPSC 2024 - The Best Strategy for Next 365 Days (Prelims & Mains)



ONLINE

Starts 16th October

ADMISSION OPEN



www.iasbaba.com



support@iasbaba.com



91691 91888

CLEAN AND GREEN VILLAGES

E. Vision- Preserving Green Cover of Indian Villages

Sustainable Development Goals (SDGs) are universal goals of development aspiration for humanity. The goals and related indicators are so interlinked that the achievement of one goal can serve as a positive stimulus for many indicators of development. For India, the Government has subsumed SDGs into nine themes. Attainment of SDGs at the local level can reflect in multiple ways in the ease of living of people in Indian villages. The Ministry of Panchayati Raj is guiding and prodding the Gram Panchayats to join hands with various departments in order to prepare convergent and holistic planning.

The new Gram Panchayat Development Plan (GPDP) follows an inclusive and participatory process with the motto of 'Leave No One Behind'. The principle of 'inclusion and participation' in the GPDP process at one level is about joining hands with various departments at the cutting-edge level, and at another level, it's about finding a place in the GPDP document the life those at the margins of the society value living and aspire to achieve. A deep desire to live in a clean and green place is innate and natural to everyone. Finding the ways to make this happen should get on the development agenda of the States especially because of its tendency to create a cascading effect on many SDGs.

Theme 5: Clean and Green Village is closely related to

- SDG-6 on Water and Sanitation;
- SDG-7 on Affordable and Clean Energy;
- SDG-12 on Responsible Consumption and Production;
- SDG-13 on Climate Action;
- SDG-15 on Life on Land.

Thus, action initiated in any one theme, turns on the shower positively impacting on multiple development indicators. Here, panchayats can take up activities like:

- Natural resource management
- Biodiversity protection
- Waste management
- Afforestation activities

According to the latest data, 1,09,135 gram panchayats have prioritized 'Clean & Green Village' as one of their focus areas for 2022-23.

- The net result is that many panchayats are coming forward with their eco plans.
- The integrated Panchayat Development Plan prepared by all panchayats is a stepping stone towards addressing many of the environmental concerns of villages.

Therefore, in this modern age of rapid technological advancements and digital transformation, India's rural local bodies are silently contributing their strength to ensuring the global target of carbon neutrality, as envisaged in the UN conference on climate change.

Components of a Clean and Green Village

SI Components Elements / Indicators

SI	Components	Elements / Indicators
1	Open Defecation Free Village (end open defecation)	1.1. Every household has access to a 'functional toilet' Everyone in the family uses the toilet 1.2. Water is available inside or near the toilet 1.3. No visible feces found in the environment

		1.4. There is at least one clean public toilet available with water facility in market area.
2	Clean and Green School	2.1. The school has functional toilet/urinal facilities separate for boys and girls 2.2. There is water available for handwashing and for use at the toilet/urinal. 2.3. There is safe drinking water available 2.4. There is an arrangement in place for maintaining the cleanliness of the sanitary complex 2.5. Bio-gas / NARDEP compost is made using school mid-day meal waste. 2.6. There are trees planted / there is a nutria-garden maintained in the school, where compost made of mid-day meal waste is applied.
3	Clean and Green Anganwadi	3.1. The Anganwadi has functional toilet / urinal facilities 3.2. There is water available for handwashing and for use at the toilet/urinal. 3.3. There is safe drinking water available 3.4. There is an arrangement in place for maintaining cleanliness of the sanitary complex. 3.5. NARDEP compost is made using mid-day meal waste. 3.6. There are trees planted / there is a nutri garden maintained, where compost is applied.
4	Scientific Management of Solid Waste	4.1. There is notice issued to all the shops, restaurants, and function halls banning single use plastics, and campaigning for the use of reusable cloth bags. 4.2. There is arrangement for 100% collection of plastic wastes from households 4.3. Organic waste is home-composted or collected from households and composted. 4.4. Plastic waste collected is sold to the recyclers or sent to the Block PWM Unit 4.5. The sanitation workers get regular wages, undergo health check-ups, and are supplied with uniforms and protective gearings.
5	Wastewater Management	5.1. There is drainage / soak pit arrangement available for wastewater not to stagnate on the streets or anywhere. 5.2. Wastewater is diverted to recharge pits 5.3. Wastewater is recycled and reused for cleaning public toilets or at solid waste management unit / for raising nursery and for watering tree plantation or expanding green cover through avenue plantations.

6	Affordable & Clean Energy	<p>6.1. There bio-gas / solar / wind energy used for lighting, cooking, or pumping water either by public institutions or individuals</p> <p>6.2. In all public buildings replace ICL bulbs, with LED bulbs; Replace T8 Tube lights with T5 Tube lights.</p> <p>6.3. Encourage children to get out and play instead of watching TV or playing on computers and other devices.</p>
7	Green Development	<p>7.1. The Panchayat supports households and schools for tree plantation, nutri-garden etc.</p> <p>7.2. The Panchayat is highly active in raising nursery and in avenue plantation / tree plantation including fruit bearing trees etc.</p> <p>7.3. The Panchayat has designated common lands, where tree plantation is maintained.</p> <p>7.4. A considerable number of households have nutria-garden, or at least a few trees such as Papaya, moringa, banana etc.</p>
8	Promotion of Organic Farming & Progressive Reduction of Chemicals	<p>8.1. The Panchayat arranges campaigns to promote natural farming, organic cultivation methods</p> <p>8.2. There is a general trend in this village to move towards chemical-free agriculture</p>
9	Celebrate Clean and Green Living	<p>9.1. There is a general trend among households to seek chemical-free / organic products</p> <p>9.2. There is an overall awareness with regard to responsible disposal of household waste, which is noticeable in people's behavior, and from the cleanliness of the village.</p> <p>9.3. The GP is involved in clean up campaigns and tree plantation at least four times a year</p> <p>9.4. The GP organizes celebration of 'Annual Clean and Green and Day', in order to recognize individuals, wards, and local institutions that contribute to Clean & Green Village. The GP recognizes 'clean wards' by instituting rolling trophy given away to cleanest ward in the GP in an annual event.</p>
10	Strengthening Local Committee & Enhance Larger Participation	<p>10.1 Local Village Swachhata Committee or team of Swachhagrahis take responsibility for Clean & Green village.</p> <p>10.2. The Village Swachhata Committee inspects public toilets, school toilets, solid waste collection in practice, wastewater recycle / reuse arrangement etc. to report to the GP.</p> <p>10.3. Village Swachhata committee prepares Annual Action Plan for improving the overall village cleanliness, and green cover.</p> <p>10.4. The Action Taken on Annual Action Plan on Clean and Green is presented to the Gram Sabha (GS) in GS meetings.</p>

Gram Urja Swaraj Abhiyaan

The Ministry of Panchayati Raj has collaborated with the Ministry of New and Renewable Energy to include the Gram Panchayats under all its schemes focusing on the adoption of renewable energy.

- Enable Gram Panchayats to evolve as self-sufficient in terms of energy and become producers of energy instead of only being consumers.
- Widespread adoption of renewable energy applications in rural areas would enable the Gram Panchayats to develop own sources of Revenue (OSR) and employment opportunities for the local youth of the villages.

Under the Gram Urja Swaraj Abhiyaan, GPs have developed their own implementation models with the support of Renewable energy development Agencies of the states. For example, Odanthurai Panchayat in Tamil Nadu has its own windmill, Thikekarwadi GP in Maharashtra has established Biogas plant in PPP mode and Meenvallam, a project of Palakkad district Panchayat in Kerala is the first initiative of a Panchayat for micro hydel power generation.

Under the Gram Urja Swaraj Abhiyaan, as on date:

- 2080 Gram Panchayats have taken up and implemented Renewable Energy Projects.
- Close to 2020 Gram Panchayats have solar energy systems that are installed and are fully functional.
- Around 60-70 Gram Panchayats have hydel energy systems and wind energy systems that are installed
- There are 106 Gram Panchayats with existing biogas energy systems.
- Further, a significant number of Panchayats are interested in making improvements in the clean and green energy domain and have an interest through the Gram Urja Swaraj Abhiyaan under the following sectors:

Particulars	Solar Energy Systems	Hydel Energy Systems	Wind Energy Systems	Biogas Energy Systems
Number of Gram Panchayats	4202	296	296	366

Source: <https://egramswaraj.gov.in/urjaDashboard.do>

Mission LiFE

The Government of India (GoI) has launched a global movement on Lifestyle for Environment (LiFE), or Mission LiFE.

- **Vision:** To harness the power of individual and collective action across the world to address the climate crisis.
- **The objective** of the movement is to nudge individuals and communities to adopt simple and specific climate-friendly behaviours in their daily lifestyles.

Panchayats hold a strategic position to drive transformative change from the grassroots.

- They can effectively oversee the adoption of eco-friendly practices and encourage active community involvement in Mission LiFE's endeavours.
- Panchayats possess the capacity to champion environmentally responsible actions within their domains, spanning waste reduction, renewable energy adoption, and sustainable agriculture, while also providing incentives.

- Through collaboration with Panchayats, Mission LiFE could gain access to local expertise, resources, and established governance mechanisms, enabling a grassroots-driven approach to sustainable living that seamlessly aligns with the mission's overarching objectives.

Capacity Building Initiatives Towards Clean and Green Village – The Way Forward

Capacity Building of Panchayati Raj Institutions (PRIs) has been one of the major activities of MoPR. The Ministry has been providing technical and institutional support for strengthening of PRIs including advocacy support for inter-ministerial and multi-sectoral coordination.

- Revamped Rashtriya Gram Swaraj Abhiyan (RGSA), a centrally sponsored scheme that aims to strengthen the capacities of institutions for rural local governance to become more responsive towards local development needs, prepare participatory evidenced-based plans, leverage technology, and efficiently utilize available resources for realizing sustainable solutions to the local problems linked to SDGs. A concentrated effort is being made at the Gram Panchayat level to encourage thematic training.
- A convergence of efforts and adequate support of ministry/departmental functionaries of drinking water and sanitation, new and renewable energy, environment, forest, and climate change, rural development, land resources, agriculture, animal husbandry, fisheries and Panchayati raj is needed to realize the noble goal of Clean and Green Panchayat.
- In addition, non-Governmental organizations, college students, youth organizations such as Nehru Yuvak Kendra volunteers, etc. also need to be involved for faster realization of the goal.
- The State Panchayati Raj Departments need to ensure activity and resource mapping are undertaken, factoring in the resources available under various schemes of the Central and State Governments.

Our rural areas have made a significant contribution to this movement.

- The total installed renewable energy capacity in India, excluding large hydro, has crossed the milestone of 100 GW.
- India stands at 4th position in the world in terms of installed renewable energy capacity, 5th in solar and 4th in wind in terms of installed capacity.

Preserving the Green Cover of Indian Villages

For forestation to be effective, the efforts need to be consistent, ongoing, and long-term. The engagement for promotion and preservation of green cover must cut across all age groups of village society.

Transferring the cultural significance

A child today will carry the influence, the sanskar to the next generation, which is critical to the intangible layer of strategy. For instance, the Chipko movement must be a story that one should grow up with as a child. Therefore, as schemes permeate to the grassroots level and actions bear fruition, the engagement of village communities through structured awareness campaigns must commence simultaneously, recognising the centrality of preserving green cover.

Similarly, the Indian Cedar, or Deodar is considered sacred, deriving its name from Sanskrit as deva meaning God and daru meaning tree, thus combined to reflect 'tree of God'. Cultural bonds will be far more effective in preserving green cover when the narrative includes the exclusive use of the revered Deodar in Hindu temples.

Our Green Gold

It is ironic that the medicinal values of trees and their role in life have been overlooked. Fortunately, the recent emphasis of the Government on alternative medicine can be dovetailed with the narrative to emphasize the need for 'living with nature'.

The Ministry of AYUSH has already formalized an eco-system that can be a catalyst for the village economy. The statement of the Prime Minister, "India is a treasure trove of herbal plants, it is, in a way, our **Green Gold**" is explicit and the Gold Mine is the 'green village' that will create Ayurveda based livelihoods and bring focus back to the village: once again.

Thus, 'green village' is an all-encompassing approach for the sustainable transformation of village: in the development paradigm.

Minimum Damage to the Green Cover

Construction is an inevitable reality and critical to the survival of green cover. Unnecessary concretization of paving and masonry boundary walls creates built mass detrimental to green cover and recharge of groundwater sources.

- In fact, groundwater is essential for the ecosystem. To maintain groundwater, green cover plays a significant role in stabilising rainfall patterns, preventing runoff, controlling surges of drains and rivulets, and keeping soil healthy and micro-organisms active for the rich ecosystem.
- The traditional practice of drawing groundwater for daily usage maintained a cycle of water management, providing filtered water rich in minerals as it percolates through rocks, rendering it fit for daily use and free of contamination in most cases. Conserving such traditional practices will accrue multiple benefits.

It is also important to emphasize that green cover is not just trees or plantations.

Green cover is a hierarchy of trees and supporting flora varieties specific to a particular region. And, in this complex balance, agriculture is essentially a human need that must respect its limits. Any disturbance of this balance is a recipe for disaster, and recent incidents of subsistence in Himachal and Uttarakhand amply demonstrate this phenomenal error.

Village life is a very sensitive model of living and requires extremely careful anthropogenic interventions. Fortunately, traditional Indian knowledge has, since ancient times, had the wisdom to deal with human habitat challenges. It is time to rediscover and contextualize the same knowledge system.

- Villages are a potential opportunity for niche tourism opportunities where 'green cover' is a novelty for urban life. The roadmap for preserving the green cover must embrace revitalization of biodiversity and revisit principles of physical growth, taking 'green' as its principal stake.
- Access to educational structures imparting modern as well as traditional Indian knowledge of their settlements is vital for the communities to be active participants in the revitalisation journey.

F. Integrated Solar Village Scheme for Inclusive Development

States need to conceptualize an integrated solar village development scheme to leverage the opportunity provided by solar for the overall economic development of the rural economy.

Rural India offers tremendous opportunities when it comes to the production and use of renewable energy, both through rooftop solar panels and distributed renewable energy applications. Some states in the country have attempted the idea of solarizing villages, such as Modhera in Gujarat, Dharnai in Bihar, and Barapitha in Odisha.

- Helps rural households **access reliable power**

- Help communities by **enabling institutions such as schools and health centers to run without disruption.**
- Solar energy helps to provide cheap and reliable renewable power to rural households in a cost-effective way
- Helps discoms reduce power procurement costs, transmission and distribution losses, and network upgrade costs, among others.
- Can be used to improve healthcare and education facilities in rural areas, access to the internet, livelihood opportunities, and grid resilience against extreme climate events.
- In addition, the installation of distributed solar is a labour-intensive exercise compared to utility-scale solar projects and thereby creates livelihood opportunities.

However, there is a need to define the concept of solar villages to incorporate comprehensive economic development of rural areas by bringing the elements of livelihoods and strengthening the services of social infrastructure. In addition, solarising villages is a viable proposition for power distribution companies (discoms) because the cost of servicing rural households is high, driven by high electricity subsidies.

Initiatives by the Government

- The Ministry of New and Renewable Energy (MNRE) offered capital subsidies for the installation of rooftop solar by residential households up to 10 KW of the system under phase II of the Grid Connected Rooftop Solar Programme launched in 2019.
- India has installed ~11 GW of rooftop solar till August 2023.
- The scheme has been further extended up to 2026 in October 2022.
- Further, the Ministry simplified the process for application and securing subsidies for rooftop solar through the SPIN portal. It also issued a framework to promote the integration of DRE livelihood applications by enhancing productivity and income while providing access to clean and reliable energy.
- Recognising the importance of DRE, many states have also introduced enabling provisions in their own renewable energy policies or solar policies with a targeted focus on rural areas.

As per CEEW-Villgro estimates, DRE-based clean energy innovations, particularly in the agriculture and textile sectors, have a market potential of ~USD 50 billion and can impact 37 million livelihoods in rural India.

An 'Integrated Solar Village Development Scheme'

States need to focus on integrated solar village development while formulating the scheme. The schemes should aim at improving the reliability and quality of power supply, boosting rural income, strengthening education and health services, and providing employment opportunities by integrative solar into the rural economy. The major contours of these schemes could be:

1. Demand Assessment - To develop an integrated, scheme, there is a need to assess the overall demand for electricity in the village, identify the solarisation opportunity and potential for different solar applications such as solar PV, pumps, and refrigerators.

2. Innovative Business Models - To meet the residential demand, there is a need to assess the viability of different business models. Deploying rooftop solar installations is suitable for pucca houses with roof ownership. However, to overcome the barriers of unsuitable rooftop conditions, high upfront costs, or a lack of consumer awareness, community solar models could be explored. It helps aggregate residential demand and set up projects on community premises.

3. Integrating Livelihoods through Decentralised Productive Appliances - This means identifying the potential applications, creating awareness, and incentivizing through credit access, among others. The scheme can

consider productive appliances in areas such as agriculture (grain milling, food processing, solar pumps), animal husbandry (feeders, cutters, vertical fodder grow units), and other allied activities (cybercafé computers, printing machines, blacksmith blowers, refrigerators).

4. Integration with Existing Policies and Regulations - The scheme needs to identify its alignment with other existing state solar schemes, such as solar street lights and solar water heater programmes, among others, which can be leveraged to provide overall development in the identified solar villages.

5. Skill Development and Capacity Building – The theme should target training youth in these rural to become Surya Mitras, enabling solar adoption in the state. There should be a dedicated focus on gender-inclusive skill development, capacity building, and employment opportunities the local level to cater to these solar villages.

6. Models for Sustenance - To ensure the sustenance of solar villages, there is a need to clearly define the roles and responsibilities of relevant stakeholders, from installation to maintenance. A village-level committee (VLC) needs to be constituted in the shortlisted villages in coordination with the State Rural Livelihood Mission, the Department of Panchayati Raj, and the Department of Rural Development. The committee will include Gram Panchayat members and other active members of the village, such as women's self- help groups and youth groups. This committee will work in coordination with the implementing agency and other relevant departments for the implementation of the scheme.

G. Crop Residue Management

Ecologically sustainable and environmentally safe management of agricultural wastes, technically called crop residues (CR), is one of the major challenges in India. Harvesting, threshing, and primary processing of crops leave behind a variety of plant materials that need safe disposal and recycling. Stubbles, stalks, stover, husk, bran, bagasse, and molasses are generally classified under CR in the Indian context. These residues, once thought to be waste, are now regarded as an important natural resource due to their versatile utility.

- CRs are primarily used as bedding material for livestock, animal feed, soil mulching, bio- gas generation, bio-manure and compost, thatching for rural homes, mushroom cultivation, biomass energy production, fuel for domestic and industrial use, etc.
- However, with the help of innovative technologies, CR can be converted into a variety of value-added products such as papers, boards, eco-panels, etc.

In spite of such practical and beneficial options, a large portion of CR is burned 'on-farm', primarily to clear the field for sowing the next crop. This destructive activity deteriorates soil properties and fertility, along with ambient air quality. Consequently, it leads to a gradual loss of production potential of farms, which has serious consequences for food security.

On-farm burning of CRs causes plenty of environmental problems and has a serious impact on human health. Soil health greatly deteriorates due to the loss of organic matter and other soil nutrients.

What are the reasons for farmers going for stubble burning?

- **Mechanisation of Agriculture:** Mechanised harvesting extracts the rice grains only leaving behind huge residue. Manual harvesting is not an option for farmers because of the huge labour charges and the increased time taken.
- **Lack of awareness:** Farmers are not realising that they are burning the soil friendly insects, organic matter, and causing considerable loss of nitrogen, DAP, Potassium.
 - Farmers believe that that if they don't burn it then this left over will float over the flooded field prepared for transplanting paddy nursery and the left over will hit the delicate paddy nursery when windy air will blow and causes damage to the crop.

- **Alternatives are Expensive:** Despite the Punjab government making available tractor-mounted 'happy seeders' to cut down the rice stubble and sow wheat seeds simultaneously, many farmers find the prices of these machines or their rents prohibitive. So, they continue to burn stubble.
 - To use a 'happy seeder' machine, farmers have to shell out Rs.1000 per acre of land as machine rent and a further Rs.2000 for diesel.
- **Reduced usage of Stubble:** Earlier, the stubble used to be used by farmers as hay to keep animals or homes warm, and even for cooking. However, these uses of stubble have now become outdated. Also, rice straw is not considered suitable as fodder for animals because of its high silica content (this is true for the non-basmati variety of rice).
- **Government Policies:** Some of the policies of government, for example Punjab Preservation of Subsoil Water Act of 2009, had unintentional effect of promoting stubble burning.

What are the effects of Stubble burning?

- **Air Pollution**
 - The process of burning farm residue is one of the major causes of air pollution in parts of north India, deteriorating the air quality.
 - Stubble burning by farmers in Haryana, western Uttar Pradesh and Punjab in north India is considered a major cause of air pollution in Delhi and its adjoining regions.
 - According to a study, the burning of crop residue released about 149 million tonnes of carbon dioxide, more than 9 million tonnes of carbon monoxide, 0.25 million tonnes of oxides of sulphur (SOX), 1.28 million tonnes of particulate matter (PM) and 0.07 million tonnes of black carbon. As evident, it contributes to a lot of greenhouse gas emissions.
 - Stubble burning across Punjab and Haryana contributes to the winter haze in Delhi where about 40% of the near-surface PM can be attributed to the stubble burning.
 - It also contributes to the winter smog seen in these parts of the country.
- **Soil Fertility**
 - The heat from burning paddy straw penetrates 1 centimetre into the soil, elevating the temperature to 33.8 to 42.2 degree Celsius. This kills the bacterial and fungal populations critical for a fertile soil.
 - The solubility capacity of the upper layers of soil has also been reduced.
 - Burning of crop residue causes damage to other micro-organisms present in the upper layer of the soil as well as its organic quality. Due to the loss of 'friendly' pests, the wrath of 'enemy' pests has increased and as a result, crops are more prone to disease.

What measures have been taken by the government to address this issue?

- Under a 100% centrally-funded scheme, in-situ residue management machines are given to individual farmers at 50% subsidy and to CHCs (custom hiring centres) at 80% subsidy.
 - The states of Punjab and Haryana are also providing such machines and setting up more CHCs.
- More than 23,000 crop residue management machines are being given to farmers for on-site management of straw.
- In 2020, the Government of Punjab appointed 8000 nodal officers in villages that grow paddy in order to put a check on stubble burning.
- Already, penalties for stubble burning are imposed on farmers who break the law and resort to burning crop residue

- The Commission on Air Quality Management in NCR and Adjoining Areas (CAQM) has developed a framework and action plan for effective prevention and control of Stubble Burning
 - **In-situ Crop Residue Management:** Crop Residue Management machines procurement, setting up of Custom Hiring Centers, extensive use of bio-decomposer (turns crop residue to manure in 15-20 days)
 - **Ex-situ Crop Residue Management-** Alternative usage of paddy straw viz. Biomass Power Projects, Co-firing in Thermal Power Plants, Feed stock for 2G Ethanol plants, Feed stock in Compressed Biogas plant, fuel in industrial boilers, WTE plants, packaging materials etc.
 - **IEC (Information, education & Communication) activities** for the plan of action
 - Standard protocol for recording and monitoring of fire counts.

What is the way ahead?

- **Dual Strategy:** Both in-situ (in the field) and ex-situ (elsewhere) solutions, as mentioned in CAQM framework needs to be effectively implemented.
- **Short term Solution:** Giving farmers easy and affordable access to the machines which allow them to do smart straw management. Use machinery like the Happy Seeder to remove the stubble. The government should make these machines available and economically viable for farmers.
- **Utilizing Crop Stubble:** Instead of burning of the stubble, it can be used in different ways like cattle feed, compost manure, roofing in rural areas, biomass energy, mushroom cultivation, packing materials, fuel, paper, bio-ethanol and industrial production, etc.
 - Eminent agricultural scientist M.S. Swaminathan has suggested that the Delhi, Haryana and Uttar Pradesh governments could set up 'Rice Bio Parks', where farmers could convert stubble into products including paper, cardboard and animal feed.
- **Government Incentives:** The government should also subsidise or incentivise the industries that are engaged in converting stubble into economically viable products. The government can also consider reinterpreting the MSP scheme to disallow the benefits of the scheme to farmers who practice crop residue burning.
- **Improving Agri-machines:** Efforts should be made to improve the combine harvester that farmers use to harvest the crop. The current machine used leaves behind a huge residue. Improvement should be made in the technology used in such machines so that minimal residue is left behind.
- **Short Duration Paddy Varieties:** One thing that scientists at the Punjab Agriculture University (PAU), Ludhiana have done is breed shorter-duration paddy varieties. These take between 13 and 37 days less time to mature than Pusa-44, while yielding almost the same. This ensures that farmers get adequate time to clear the fields for next crop.
- **The long-term solution** has to be crop diversification, away from paddy. Encourage farmers to sow alternate crops and shift them away in the long run from paddy to maize, fruits, vegetables and cotton.
- **Farmer Education:** Farmers have a difficult time unlearning the practice of stubble burning and they should be educated about its ill-effects and also offered attractive alternatives.

India's First Green Village – Khonoma

Khonoma is a village in India, which has been declared as India's first green village out of approximately 7,00,000 villages in India, by the Government of Nagaland and the Government of India. This has been made possible by the joint efforts of indigenous habitants of Khonoma, the Government of Nagaland, and Government of India through launching the 'Green Village project' of INR 30 million in 2005. The tribes of Nagaland are born warriors, who used to play head hunting as a game and it is said that they may eat anything that can move. But to make the village, a green, self-reliant, and sustainable village; the villagers stopped hunting animals and cutting off the trees. They are practising jhoom cultivation, terraced farming, forest conservation, bamboo handicrafts, and more. They are following and fully utilising the Govt. initiatives and funds allocated for different schemes like Swachh Bharat Abhiyan, MNGREGA, and others. Along with this, the village is also preserving its inherent culture, heritage, and tradition.

Water for Clean and Green Village

A sustainable and self-sufficient village with the theme of a 'Clean & Green Village', as thought by Mahatma Gandhi will improve village life and reduce the rate of migration to the cities. If a Green Panchayat resolves to transform itself into a clean and green village, it should focus on:

- Awareness generation among the citizens on the importance of reducing wastage, ensuring sustainable production and consumption and reducing the adverse impact on the environment.
- Promotion of measures within the GPs that would reduce environmental pollution, such as reducing the use of plastics within the GP area.
- Taking steps to create an in-depth understanding of the term climate change and its impact among the Gram Sabha, Panchayat committees, and other community volunteers.
- Mapping land use patterns, water bodies, forests, hill slopes, wetlands, and degraded forests within the GP.
- Developing appropriate norms for sustainable utilisation of resources from common lands, water bodies, and forests on materials like non-timber forest produce, sand, fish, and water.
- Assessing the water needs, sources, schemes, and solid and liquid waste being generated and preparation of District and Village Water Conservation Plans.
- Setting the water and sanitation goals and target for the Gram Panchayats.
- Selection of appropriate technology for water supply and sanitation in the GPs, based on participatory and area assessment in markets and GP premises.
- Ensuring maintenance of toilets, public spaces, including those in markets and GP premises.
- Developing a comprehensive energy programme based on need assessment.

IDEA – 'India Digital Ecosystem for Agriculture'

Context: Recently, Government has launched an initiative called **India Digital Ecosystem for Agriculture (IDEA)** that would place the farmer in the centre of the agriculture ecosystem leveraging open digital technologies

Key Features of IDEA

- It will incorporate a **National Farmers Database**, a sort of 'super Aadhaar' for farmers.
- The database will include **farmers' digitised land records**, and cross-linked with the Aadhaar database so as to create a unique FID, or a farmers' ID.
- On top of that, it will pull **information from running schemes** like the PM Kisan, soil health cards, the national crop insurance scheme PM Fasal Bima Yojna, and so on.
- The database is being built by **Microsoft** under the aegis of the Department of Agriculture & Farmers' Welfare (DoAFW)
- This database will enable anyone with access to it to
 - uniquely identify a landholder
 - know the extent of his holding
 - the state of the soil
 - cropping patterns and average yields
 - and other such information at a granular level.

What is the larger objective of IDEA?

- **Agri-Stack:** The creation of the FID is only one part of the grand IDEA. The plan is to create the agriculture equivalent of the 'India Stack' — a set of APIs (Application Programming Interface). These apps enables stakeholders to offer proactive and personalised services to farmers and improve the efficiency of the agriculture sector.
- **Innovation through Collaborations:** This Agricultural India Stack will allow governments, businesses, start-ups and developers to utilise an unique digital Infrastructure to solve India's hard problems towards presence-less, paperless, and cashless service delivery.
- **Governance Delivery:** The FID — would enable 'single sign-on' for access to all government services offered to farmers.
- **Evidence based policy making:** Such database for the agriculture sector, enables authorities to deliver seamless credit and insurance services, information related to seeds, fertilisers, pesticides, market information and price forecasts etc, driven by big data and analytics and powered by information technology.
- The 'agrystack', the government is hoping, will help eventually achieve the goal of **doubling farmers' income**.

Challenges

- India has more than **14 crore working farms** making the digitisation process challenging.
- **India's land records** in general and rural, agricultural land records in particular, are complex & not having common standards.
- Nearly about 12% of agricultural households operated on leased land — in other words, they are **tenant farmers**. However, there is no legal recognition of land tenancy agreements in India, with most such agreements tending to be informal and verbal in nature. In such case, FID will exclude these farmers from receiving benefits, as they won't figure in database at all.
- Then there is problem of **women farmers** as vast majority of land titles continue to be held by men.

- There is a concern that the agristack is the precursor to a **complete privatisation** of government services extended to agriculture.
- There is also the big concern over **data privacy**. Giving away this kind of sensitive, financial and landholding information in the absence of a data privacy law raises multiple concerns over potential misuse.

Technology adoption in the agriculture sector

- **Remote sensing** (via satellites), GIS, crop and soil health monitoring, and technologies for livestock and farm management are examples of technologies that are helping to improve agricultural efficiency.
- **Seed quality enhancement:** The quality enhancement can be done with advanced techniques, adopting seed management strategies resulting in creating high-yield seed varieties.
- **Solar-powered water pumps:** These pumps use the abundant solar power available to pump water from the ground. These provide an energy-efficient way. Hence, reduce the cost of production and increase profits for farmer.
- **Per capita availability of fruits and vegetables is quite low** because of post-harvest losses which account for about 25% to 30% of production. But, adoption of cold storage chain technology for perishable and other perishable allied agri-commodities has helped to reduce wastage and improve the gains to farmers and consumers substantially.
- **ICT sectors** such as e-choupal is an example of an efficient supply chain system empowering the farmers with timely and relevant information enabling them to get better returns on their investment.
- **E-governance** in areas like- maintenance of land records is a great step in removing the malpractices and creating assurance of rightful ownership.
- **Aadhar-linked bank accounts and government records** provide access to monetary benefits by establishing the correct identity, in turn solving the problem of access to credit.
- **Direct farm-to-door connectivity** through e-commerce and m-commerce platforms has facilitated a large number of artisans to cut the middleman share and get fair prices for their produce.
- **Agro-based small enterprises** such as providing tractors & other farm equipment on rent at reasonable rates in rural areas helped to reduce the cost of production. e.g. : UBER enabled farm equipment on the rent system through UBER apps.
- **Better access to information** through the Kisan Suvidha app and DD Kisan Channel helped to improve efficiency in agriculture.
- **GPS mapping**, which helps farmer in accessing the need i.e. where they need to put more fertilizer or less, as per requirement of the soil. GPS enabled services are also helping in field of documentation about yield, moisture, etc.

All the best,
Team IASbaba 😊

IAS BABA

TLP CONNECT 2024

INTEGRATED PRELIMS CUM MAINS TEST SERIES



75 MAINS TESTS



ONE ON ONE MENTORSHIP



APPROACH VIDEO,
ENRICHED SYNOPSIS
& RANKING

T
L
P
C
O
N
N
E
C
T

BABAPEDIA
(FOR CURRENTAFFAIRS)



68 PRELIMS
TESTS



DISCUSSION CLASSES
AFTER EVERY MAINS
TEST (ONLINE)



UPSC 2024

ENROLL NOW

STARTS 16TH OCTOBER

ONLINE & OFFLINE