YOJANA

OCTOBER 2023 A DEVELOPMENT MONTHLY

INFRASTRUCTURE

DO YOU KNOW?

PM VISHWAKARMA

A significant section of the workforce of the Indian economy consists of artisans and craftspeople who work with their hands and tools, are usually self-employed, and are generally considered to be a part of the informal or unorganised sector. These traditional artisans and craftspeople are referred to as 'Vishwakarmas' and are engaged in occupations like blacksmiths, goldsmiths, potters, carpenters, sculptors, etc. These skills or occupations are passed from generation to generation following a *guru-shishya* model of traditional training, both within the families and other informal groups of artisans and craftspeople.

In this backdrop, a new scheme, called 'PM Vishwakarma', aims at improving the quality as well as the reach of products and services of artisans and craftspeople and to ensure that the *Vishwakarmas* are integrated into the domestic and global value chains. It is the goal of this Scheme to offer holistic end-to-end support to the Vishwakarmas, i.e. the artisans and craftspeople, to enable them to move up the value chain in their respective trades. It will bring a qualitative shift in the way these occupations are practised by artisans and craftspeople and this will uplift their socio-economic status as well as their quality of life.

PM Vishwakarma will be implemented as a Central Sector Scheme, fully funded by the Government of India, with an initial outlay of Rs 13,000 crore. The Scheme will be conjointly implemented by the Ministry of Micro, Small and Medium Enterprises (MoMSME), the Ministry of Skill Development and Entrepreneurship, the Department of Financial Services, and the Ministry of Finance, Government of India. PM Vishwakarma will be initially implemented for five years up to 2027-28.

The Scheme aims to provide several benefits to the Vishwakarmas, who are either self-employed or intend to set up their own small-scale ventures. The support provided through this Scheme to such beneficiaries will not only contribute to the preservation of cultural practices, generational skills, and *guru-shishya parampara* but will also provide an identity and recognition to them. PM Vishwakarma is a holistic Scheme that envisages to provide end-to-end support to the artisans and craftspeople through the following components: i) Recognition: PM Vishwakarma Certificate and ID Card, ii) Skill Upgradation, iii) Toolkit Incentive, iv) Credit Support, v) Incentive for Digital Transactions, and vi) Marketing Support.

Through the implementation of the Scheme, it is expected that beneficiaries who are currently working as entrepreneurs in the unorganised sector will be able to scale up their operations, modernise/upgrade their tools and business, enter the formal economy as an entrepreneur, and contribute towards the larger goal of nation building.

A three-tier Implementation Framework at the national, state, and district levels, i.e. the National Steering Committee, State Monitoring Committee, and District Implementation Committee, respectively, has been provided for the implementation of PM Vishwakarma. The operational guidelines of the Scheme, containing the process flow from registration to disbursal of benefits along with the templates, will be formulated by the National Steering Committee and approved by MoMSME. An online monitoring system will be put in place. ❑

Source: pmvishwakarma.gov.in

OCTOBER 2023

Volume-67
No. 10

YOJANA

Since 1957 A DEVELOPMENT MONTHLY

Let noble thoughts come to us from all sides.
Rig Veda

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YOJANA, a development monthly published since 1957, is a theme-based journal providing in-depth analyses and views on socio-economic issues in the broader framework of government policies. Although published by the Ministry of Information and Broadcasting, YOJANA is not restricted to expressing the official point of view.

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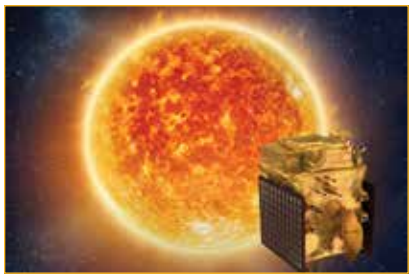

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ONE EARTH · ONE FAMILY · ONE FUTURE

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YOJANA is published in Assamese, Bengali, English, Gujarati, Hindi, Kannada, Malayalam, Marathi, Odia, Punjabi, Tamil, Telugu, and Urdu.

Karmayogi Bharat, a Game-changer

I was reading an article in Yojana magazine titled 'Making of a Bureaucrat.' It is an eye-opener regarding how the government is shaping the future of Indian administration. The concept of transitioning from a 'rule-bound bureaucrat' to a 'role-driven civil servant' is a game-changer and will undoubtedly propel Bharat towards development. I understand that there are challenges, but the government's efforts are truly commendable. I am a journalist and have worked in different states. I have had the opportunity to meet and collaborate with many bureaucrats. I can sense and observe the changes you are referring to. Karmayogi Bharat is an incredible project. Additionally, as a journalist, I appreciate the statement 'Content is the King,' and I wholeheartedly agree with it. I also find the concept of the 'weekend pyramid' intriguing. I believe this article should be read by corporate professionals and other HR experts as well.

– Vivek Kumar Pandey
Bennett Coleman & Co. Ltd.

Governance & Reforms

Governance is the bedrock upon which an institution or organisation stands. It holds true for a nation as well. Good governance leads to prosperity. The September issue of 'Yojana' covering the entire gamut of governance and reforms was thought-provoking. 'Lead article' by K Srinivas, narrating the transformation of a civil servant through 'Mission Karmayogi', is thought-provoking. A well-researched article by the CAG vividly narrates the role of the CAG as a watchdog in Public Financial Management, various types of audits, the role of auditors, etc., in a lucid manner. Other articles like 'Direct Tax Reforms', 'Parliamentary Committees', 'Law Commission of India', and 'Administrative Reforms' penned by the experts in the respective fields are easy to understand. Team 'Yojana' deserves all-round applause.

– Pratap Nayak
Bhubaneswar

Selection of Topics

Team Yojana has done a fantastic job by selecting relevant topics about current issues and then collecting and meticulously preparing the in-depth analysis of the given subject. Your analysis of the 'Parliamentary Committees' is superb because in-depth information is valuable and easy to comprehend. Also, I was surprised to see the end notes for this topic. There were thirteen points in this, and I understand how much it takes to undergo all these materials and then extract crisp and relevant information. I also appreciate your effort to prepare relevant topics like CAG functioning and all other topics related to this superb issue. Hats off to your hard work and dedication. Thanks.

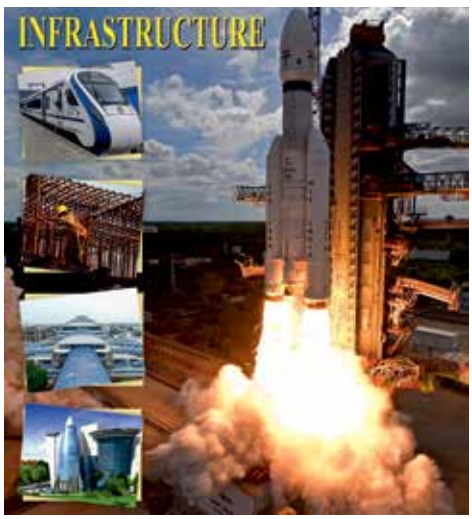
– Anoop Sharma
Uttar Pradesh

Insightful August Issue

The August 2023 issue of Yojana was thought-provoking. It gave a complete insight into India's achievements in 75 years. Articles on 'Azadi Ka Amrit Mahotsav', Vision for the Industry, Atal Innovation Mission, and India's G20 Presidency were very insightful and gave clarity about how India is going on the development path. I request that you please bring up a separate issue on India's election process. Thank you, Yojana team, for bringing up great issues for students. Thanks once again.

– Md Wahid Sarwar
Jharkhand

Time·Speed·Scale



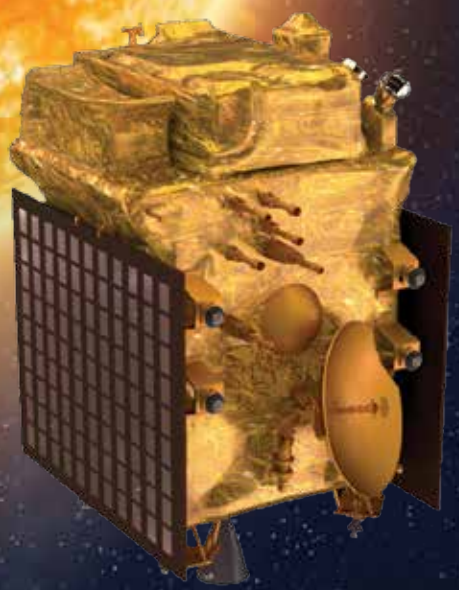
A well-knit and coordinated system of transport plays an important role in the sustained economic growth of a country. The present transport system of the country comprises several modes including rail, road, coastal shipping, air transport, etc. Transport has recorded substantial growth over the years, both in the spread of the network and in the output. The Ministry of Shipping and the Ministry of Road Transport and Highways are responsible for the formation and implementation of policies and programmes for the development of various modes of transport.

There was a need to create multimodal and last-mile connectivity infrastructure across the country. This would ensure a modal mix of transportation, reduced logistics costs, increased export competitiveness, and a cycle of higher investments, growth, and employment generation in the economy. To institutionalise holistic planning, integration of existing progress by different ministries, and synchronised project implementation, the PM GatiShakti National Master Plan was launched that adopts a 'whole of the government approach' and 'cooperative federalism' to transform India's infrastructural landscape. Its objective is to improve multimodal connectivity and logistics efficiency and address critical infrastructure gaps for seamless movement of people, goods, and services in the country. At the time when India successfully led the powerful and resourceful grouping of nations under the G20 and made strides in space exploration, it is an opportune time to discuss infrastructure on time, speed, and scale.

India's transport networks, have seen a sea-change with time. They have improved connectivity, lower logistical costs, enhanced ease-of-doing business, and helped India become a major economy. Under the umbrella of the PM GatiShakti National Master Plan, a transformative approach for economic growth and sustainable development has been brought to action driven by seven engines, namely: Railways; Roads; Ports; Waterways; Airports; Mass Transport; and Logistics Infrastructure, which are ensuring economic transformation, seamless multimodal connectivity and logistics efficiency. PM GatiShakti incorporates infrastructure schemes like Bharatmala, Sagarmala, inland waterways, dry/land ports, UDAN, etc. Economic zones like textile clusters, pharmaceutical clusters, defence corridors, electronic parks, industrial corridors, fishing clusters, and agri-zones are being covered to improve connectivity and to make Indian businesses more competitive. They also leverage technology extensively, including spatial planning tools and imagery, for timely delivery.

Harnessing cutting-edge technologies by leveraging innovations aims to improve the efficiency of Infrastructure in India. With PM Gatishakti, a transformative initiative that holds the promise of driving India into a new era of growth and connectivity, there lies the potential to redefine India's Infrastructure landscape. Now, it's time for India to embrace this opportunity. With this issue of Yojana on Infrastructure, we invite our readers to explore a future where India's Infrastructure is not just modes of transportation but a pathway to experience the mutual contribution of technology and infrastructure to achieve growth and prosperity. ❑

VOYAGE TO STUDY THE EARTH'S SUN



Aditya-L1 is the first space-based Indian mission to study the Sun. Through various orbit raising manoeuvres and the cruise phase over about the next four months, the spacecraft shall be placed in a halo orbit around the Lagrange point 1 (L1) of the Sun-Earth system, which is about 1.5 million km from the Earth.

The spacecraft carries seven payloads to observe the photosphere, chromosphere and the outermost layers of the Sun (the corona) using electromagnetic and particle and magnetic field detectors.

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 the solar energy the 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

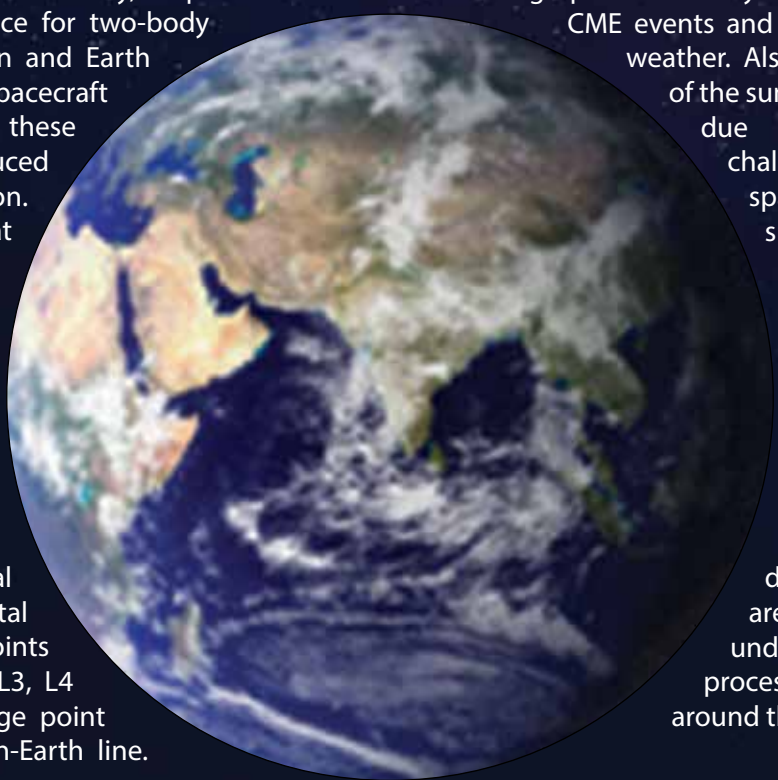
15 million degrees Celsius. At this temperature, a process called nuclear fusion takes place in the core which powers the Sun. The visible surface of the sun known as photosphere is relatively cool and has temperature of about 5,500°C.

About Aditya-L1

Aditya-L1 is the first space-based observatory class Indian solar mission to study the Sun. A satellite placed in the halo orbit around the L1 point has the major advantage of continuously viewing the Sun without any occultation/ eclipse. This will provide a greater advantage of observing the solar activities continuously. Using the special vantage point of L1, four payloads directly view the Sun and the remaining three payloads carry out in-situ studies of particles and fields at the Lagrange point L1. The suit of Aditya-L1 payloads are expected to provide most crucial information to understand the problems of coronal heating, Coronal Mass Ejection, pre-flare and flare activities, and their characteristics, dynamics of space weather, study of the propagation of particles, and fields in the interplanetary medium, etc.

Lagrange Points

For a two-body gravitational system, the Lagrange Points are the positions in space where a small object tends to stay, if put there. These points in space for two-body systems such as Sun and Earth can be used by spacecraft to remain at these positions with reduced fuel consumption. Technically at Lagrange point, the gravitational pull of the two large bodies equals the necessary centripetal force required for a small object to move with them. For two body gravitational systems, there are total five Lagrange points denoted as L1, L2, L3, L4 and L5. The Lagrange point L1 lies between Sun-Earth line. The distance of L1 from Earth is approximately 1% of the Earth-Sun distance.



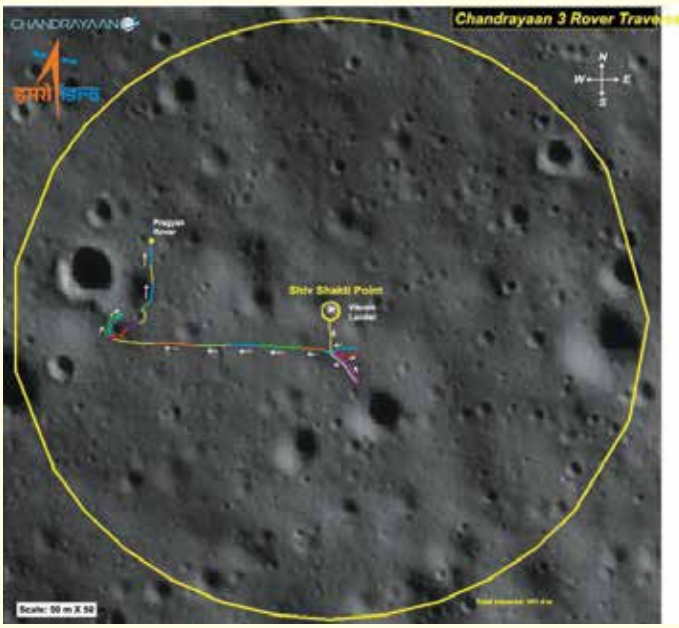
Why Study Sun from Space?

The sun emits radiation/light in nearly all wavelengths along with various energetic particles and magnetic field. The atmosphere of the Earth as well as its magnetic field acts as a protective shield and blocks a number of harmful wavelength radiations including particles and fields. As various radiations don't reach the surface of the Earth, the instruments from the Earth will not be able to detect such radiation and solar studies based on these radiations could not be carried out. However, such studies can be carried out by making observations from outside the Earth atmosphere i.e., from space.

Due to the limited mass, power and volume of the spacecraft that carries the scientific payloads in space, only a limited set of instruments with limited capacity can be sent on-board the spacecraft. In case of Aditya-L1, all the measurements will be made from the Lagrange point L1. As an example, the various phenomena of the sun are multi-directional and therefore the directional distribution of energy of explosive/eruptive phenomena will not be possible to study with Aditya-L1 alone.

Another Lagrange point known as L5 is a good vantage point for studying the Earth directed CME events and assessing the space weather. Also, the polar regions of the sun are not well studied due to technological challenges of achieving spacecraft orbits for such studies. The sun polar dynamics and magnetic fields are believed to play important role in deriving the 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. ❑

Source: ISRO



CHANDRAYAAN-3

INDIA'S SUCCESSFUL LUNAR MISSION

"I reached my destination and you too!"

This message by Chandrayaan-3 scripted history, marking India's first successful landing on the Moon. On 23 August 2023, the Indian Space Research Oragnisation (ISRO) initiated the final step for the Moon landing—the Automatic Landing Sequence (ALS) of the Chandrayaan-3 Lander, Vikram, which soft-landed on the lunar surface, making India the fourth country in the world to land on the lunar surface and the first country ever to land near the south pole of the Moon, a region that has never been explored before.

Launched on LVM3-M4 from the Satish Dhawan Space Centre, Sriharikota, the spacecraft began its journey on 14 July 2023. Chandrayaan-3, which consisted of two parts — the propulsion and the Lander-Rover modules, was developed indigenously exhibiting India's striking technological capability. Apart from its vision of demonstrating end-to-end capability in safe landing and roving on the lunar surface, Chandrayaan-3 also aimed to carry out various in-situ scientific experiments about the Moon's atmosphere, soil, and minerals. The successful landing of the Vikram Lander has paved the way for India's future landing missions and other technological progress in interplanetary exploration.

India's space journey, from launching its first sounding rocket to a successful Lunar Mission, has been remarkable. The growth of the Indian space sector is a testament to the grit and determination of thousands of scientists, engineers, and technicians who believed in Dr Vikram Sarabhai's vision that 'we must be second to none in the application of advanced technologies to the real problems of man and society'. With successful space missions in recent years, India has now taken the brand of 'Make in India' to the Moon. ISRO's various projects including the Mars Orbiter Mission (MOM), 'AstroSat'—India's first dedicated Space Astronomy Observatory, IRNSS—India's own regional navigation satellite system (also known as NavIC) are not only demonstrating India's capabilities in space technology, but also establishing India as a pioneer in the global space

sector. Furthermore, ISRO has signed agreements and MoUs with several countries and international organisations for joint missions and technology transfers.

However, the potential of the space sector is much greater than just launching satellites or exploring space. ISRO has taken giant steps in the direction of connecting space applications and technology with every aspect of governance as well. Today, space applications are increasingly used in fields like agriculture, water resources, land use/land cover, rural development, earth and climate studies, geosciences, urban infrastructure, disaster management support, and forestry.

To empower India in the field of space by enabling the participation of the Indian private sector, IN-SPACe (Indian National Space Promotion and Authorization Centre) was created to enable policy changes by the Government and provide a level playing field for private companies and startups. Presently, ISRO is working with over 150 space startups that have emerged within a short span of time, and with continued support from the Government and private sector participation, India is set to leave an indelible mark in the domain of space exploration and technology worldwide.

The quantum leap, witnessed by the Indian space sector in the last few years, has inspired scientific curiosity among the youth and has encouraged them to be a part of this glorious scientific and technological journey. ❑

Source: 'Mann ki Baat' booklet

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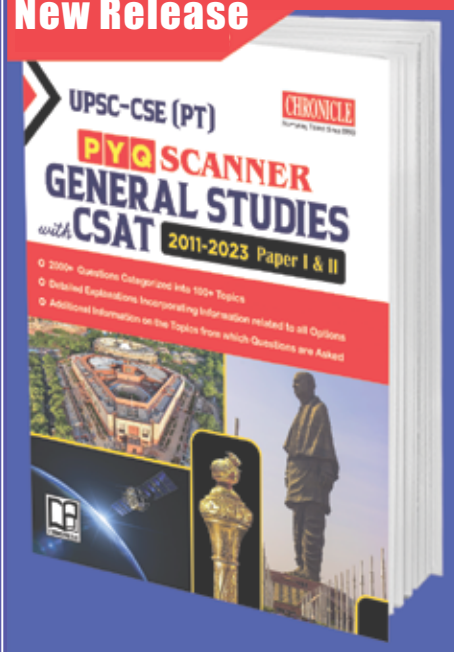

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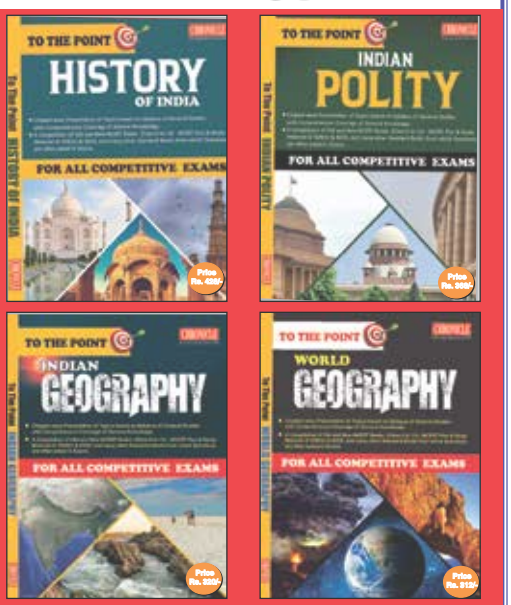

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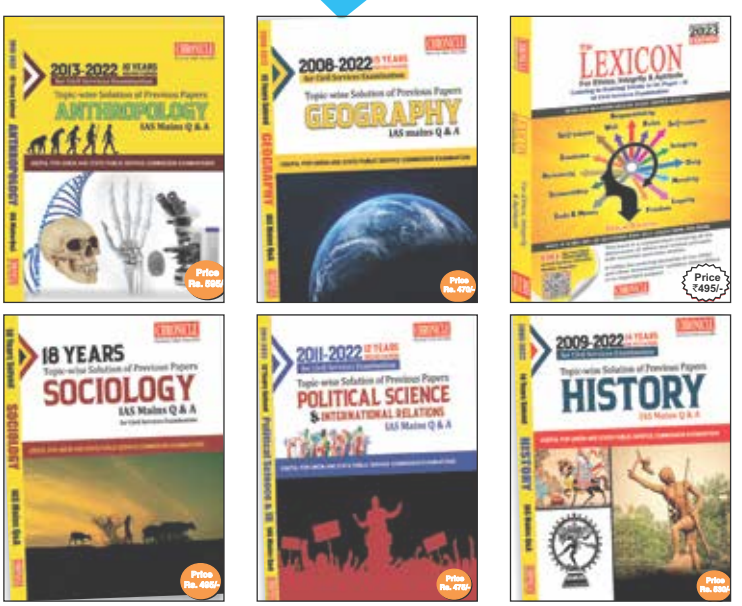

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SPACE INFRASTRUCTURE

Space activities in the country were launched with the establishment of the Indian National Committee for Space Research (INCOSPAR) in 1962. Work on the Thumba Equatorial Rocket Launching Station (TERLS) near Thiruvananthapuram was also started during the same year. In August 1969, the Indian Space Research Organisation (ISRO) was established. In June 1972, the Space Commission and the Department of Space (DOS) were constituted by the Government of India (GoI), and ISRO was brought under the DOS in September 1972.

ISRO is the space agency of India. The organisation is involved in science, engineering, and technology to harvest the benefits of outer space for India and mankind. It is a major constituent of the Department of Space, Government of India. The department executes the Indian Space Programme primarily through various centres or units within ISRO.

ISRO was formed on 15 August 1969, and superseded INCOSPAR with an expanded role to harness space technology. The prime objective of ISRO/DOS is the development and application of space technology for various national needs. To fulfil this objective, ISRO has established major space systems for communication, television broadcasting, and meteorological services; resource monitoring and management; and space-based navigation services. ISRO has developed satellite launch vehicles, PSLV and GSLV, to place the satellites in the required orbits.

Alongside its technological advancement, ISRO contributes to science and science education in the country. Various dedicated research centres and autonomous institutions for remote sensing, astronomy and astrophysics, atmospheric sciences, and space sciences in general function under the aegis of the Department of Space. ISRO's own lunar and interplanetary missions, along with other scientific projects, encourage and promote science education, apart from providing valuable data to the scientific community, which in turn enriches science.

The Space Commission formulates the policies and oversees the implementation of the Indian

space programme to promote the development and application of space science and technology for the socio-economic benefit of the country. DOS implements these programmes mainly through ISRO, the Physical Research Laboratory (PRL), the National Atmospheric Research Laboratory (NARL), and the North EasternSpace Applications Centre (NE-SAC). Antrix Corporation Ltd. and New Space India Ltd. are the two central public sector enterprises set up for the commercialisation of R&D activities of DOS. The DOS Secretariat and ISRO Headquarters are located at Antariksh Bhavan in Bengaluru. Programme offices at ISRO Headquarters coordinate the programmes like satellite communication, earth observation, navigation, launch vehicles, space science, disaster management support, sponsored research schemes, human Spaceflight, international cooperation, systems reliability and quality, safety, budget and economic analysis, human resources, capacity building, and public outreach. The major establishments of DOS and their areas of activities are:

Vikram Sarabhai Space Centre (VSSC)

VSSC, Thiruvananthapuram, is responsible for the design and development of launch vehicle technology. The Centre pursues active research & development and has developed core competence in various disciplines related to aerospace systems. 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)

URSC, Bengaluru, is the lead centre for design, development, and the realisation of communication, navigation, remote sensing, scientific, and small satellite missions. The specialised teams of scientists, engineers, and technicians of URSC have built complex and advanced satellites for various applications in areas of telecommunications, television broadcasting, VSAT services, tele-medicine, 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.

Satish Dhawan Space Centre (SDSC)-SHAR

SDSC-SHAR, the 'Spaceport of India', is the backbone of the ISRO in providing launch base infrastructure for the Indian Space Programme. 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.

Liquid Propulsion Systems Centre (LPSC)

LPSC is 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. LPSC activities and facilities are spread across its two campuses, namely, LPSC, Valiamala, Thiruvananthapuram, and LPSC, Bengaluru. The activities on its campus at Valiamala include design and development entities for earth-storable, cryogenic, semi-cryogenic, and electric propulsion systems. The end-to-end

Liquid Propulsion Systems Centre (LPSC), Bengaluru

design, development, and realisation of flow control components and modules, advanced manufacturing and proto fabrication, as well as R&D activities in the areas of propulsion and structure, 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. The communication transponders developed at this centre for the INSAT and GSAT series of satellites are used by the Government and private sector for VSAT, DTH, Internet, broadcasting, telephony services, etc. 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)

HSFC was 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. HSFC is 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 a technology aggregator. The centre is currently operating from the ISRO-HQ campus, Bengaluru.

National Remote Sensing Centre (NRSC)

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, faculty, and students. NRSC operates through multiple campuses to meet national and regional geospatial needs.

ISRO Propulsion Complex (IPRC)

IPRC, Mahendragiri is 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. IPRC is equipped with state-of-the-art facilities necessary for realising cutting-edge technology products for ISRO's space programmes.

ISRO Telemetry, Tracking and Command Network (ISTRAC)

ISTRAC, is 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. It 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)

MCF is responsible for On-Orbit Operations (OOP) and Launch & Early Orbit Phase (LEOP)

operations of geostationary/ geosynchronous & IRNSS class of spacecrafts of ISRO. Master Control 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.

ISRO Inertial Systems Unit (IISU)

IISU, Thiruvananthapuram, is responsible for the design and development of Inertial Systems 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. IISU is engaged in continuous Research and Development.

Laboratory for Electro-Optics Systems (LEOS)

LEOS, Bengaluru, is 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. Optical systems include optics for remote sensing cameras, radiometers, sensors, optical filters, photo masks, optical coatings, IR detectors, Rad Hard UV Dosimeter, and THz photometers. 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)

IIRS, Dehradun, is a premier institute with a primary aim to build capacity in Remote Sensing and Geoinformatics and their applications through education and training programmes at the postgraduate level. Formerly known as Indian Photo-Interpretation Institute (IPI), founded in 1966, the Institute is the first-of-its kind in entire South-East Asia. While nurturing its primary endeavour to build capacity among the user community by training mid-career professionals since its founding, the Institute 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. To this end, it works with user agencies to experiment with innovative configurations to meet their requirements. It is through these application-oriented experiments and demonstrations for communications, production of educational communication material, and joint working with end-users – with the 'end-to-end' approach - that DECU facilitates covering the 'last mile' in space applications. The unit has been responsible for the conceptualisation and demonstration of many societal applications of satellite communications.

Physical Research Laboratory (PRL)

PRL, Ahmedabad is 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. The primary mandate of the PRL is to carry out research, publish scientific papers, and develop appropriate instrumentation to enable their specific science goals.

National Atmospheric Research Laboratory (NARL)

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 of the earth's atmosphere through observations and modelling. Towards realising this vision, NARL gives equal emphasis to technology development, observations, data archival and

National Atmospheric Research Laboratory (NARL)

dissemination, data assimilation, and modelling. NARL 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.

North Eastern-Space Applications Centre (NE-SAC)

NE-SAC is 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. The centre also 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. The Centre has provided more than two decades of dedicated service for the holistic development of the NER of India.

Indian Institute of Space Science and Technology (IIST)

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. The institute offers undergraduate, postgraduate, doctoral, and post-doctoral programmes in broad areas of space science, technology and applications. The institute is committed to excellence in teaching, learning, and research. 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)

Antrix Corporation Limited with its corporate office in Bengaluru is a wholly-owned Government of India company under the administrative control of DOS. Antrix is 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

New Space India Limited (NSIL)

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. The Government enhanced the role and scope of NSIL to encompass more responsibilities in the primary business areas and widen the scope in June 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. IN-SPACe operates with its headquarters in Ahmedabad and field offices in Bengaluru and Mumbai. ❑

Source: ISRO

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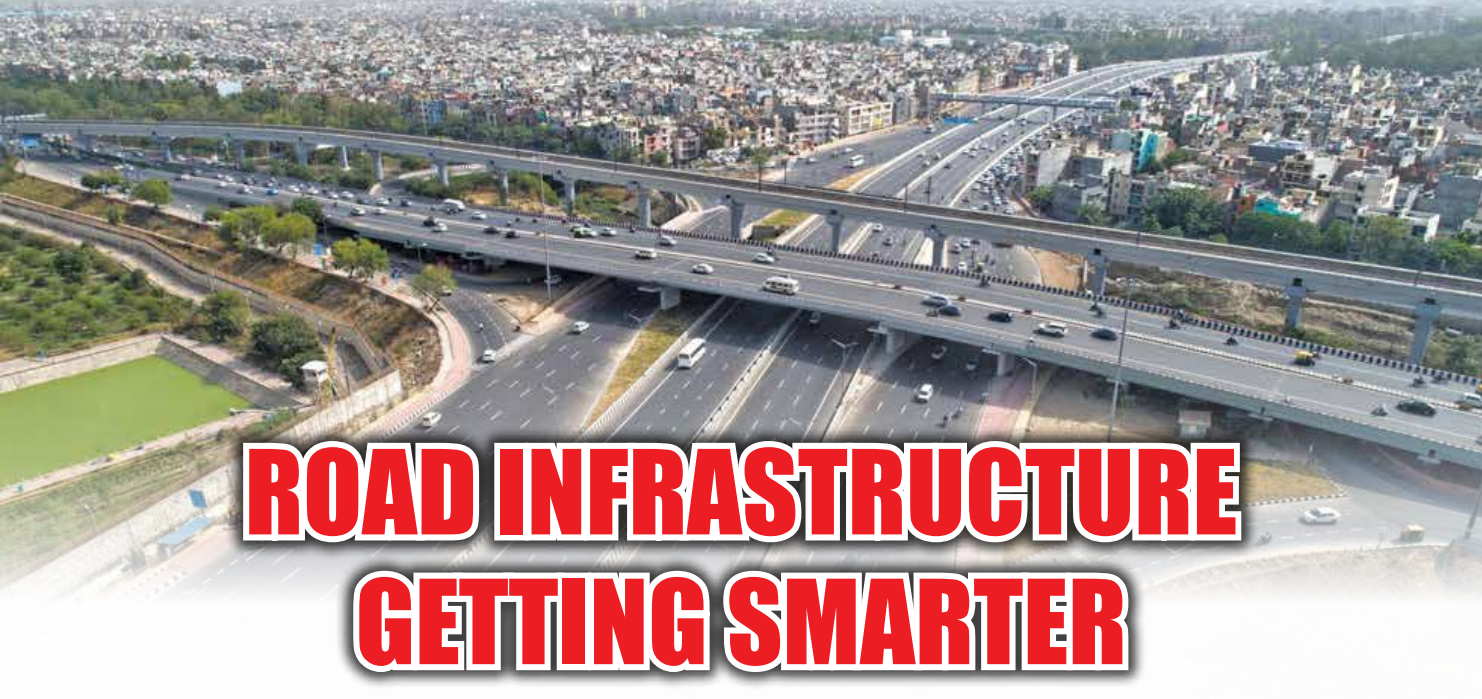

ROAD INFRASTRUCTURE GETTING SMARTER

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.

G RAGHURAM

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India's road infrastructure is classified into six categories. The road length in kilometres (kms) of each of the categories and its compounded annual growth rate (CAGR) in percentage over 1991, available most recently as of 31 March 2019, as per the 2022-23 annual report of the Ministry of Road Transport and Highways (MoRTH) is shown in Figure-1.

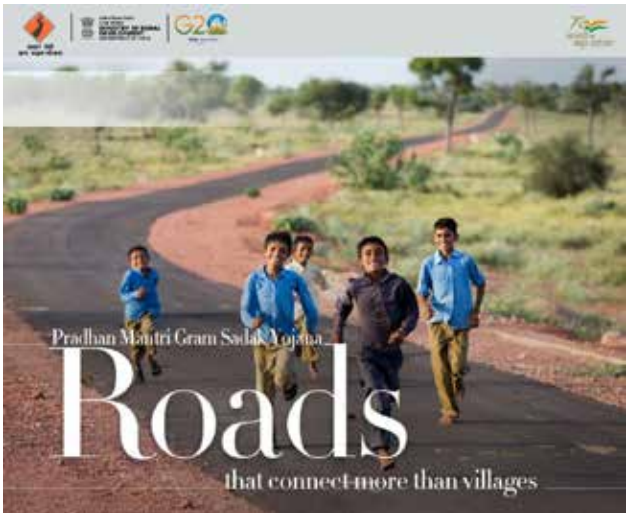
India has the second-longest road length among all countries (the USA has the longest road length). The CAGR of total road length since 1991 to 2019 has been 3.64%. The CAGR between 1951 and 1991 was 4.50% on a much lower base. The total road length in 1951 was about 4 lakh km, and in 1991 it was about 23 lakh km. In absolute terms, we have added about 40 lakh km in the last 28 years, compared to adding about 19 lakh km in the earlier 40 years. The growth in road infrastructure has been quite transformational.

The CAGR of National Highways (NH) has been the highest since 1991 at 5.02%, followed by rural roads at 4.67%. After 2019, more roads, especially State Highways (SH), have been reclassified as NH for upgradation. The current figure as of 31 March 2023 is 1,44,955 km of NH and 1,67,079 km of SH.

At the other end of the spectrum, there has been attention to penetrative connectivity by providing all-weather roads in rural areas through the *Pradhan Mantri Gram Sadak Yojana* (PMGSY). This project was initiated in 2001 and has played a major role in improving access and consequent development. Rural roads constitute over 70% of the total road length in India.

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

Figure-1



Thus, 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.

- **Delinking Road Development and Direct Employment:** In the period until liberalisation, while there was planned focus on road development. [Nagpur Plan (1943-1963), Bombay Plan (1961-81), Lucknow Plan (1981-2001)], it was also connected with direct employment generation. This resulted in labour intensive means of construction, putting a cap on the quality of roads. It was only in the late 90s when this mindset changed and the use of capital-intensive high-tech road making equipment was brought in.
- **Creation of National Highways Authority of India (NHAI):** The NHAI became operational in February 1995, to directly drive the development of NH. It was always said that 2% of India's roads (essentially the NHs) carried 40% of the traffic. Prior to NHAI, the NH development and maintenance was the responsibility of the state with funding from the Centre.

Year (as on 31 March)	NH length (kms)	Year (as on 31 March)	NH length (kms)
2011	70,934	2017	1,14,158
2012	76,818	2018	1,26,350
2013	79,116	2019	1,32,500
2014	91,287	2020	1,32,500
2015	97,991	2021	1,38,376
2016	1,01,011	2022	1,41,345
		2023	1,44,955

- **Bringing in Public-Private Partnerships (PPP):** Discussions around this began as early as 1996, during the early days of NHAI. The initial concession agreements (CAs) were loaded in favour of the Government, making it unattractive for private parties to enter this domain for financing, building, and operations and maintenance (O&M). PPPs, if at all, happened in short segments like bypasses and road over bridges, where traffic risks were low.
- **Creation of State-Level Road Development Corporations:** As the NHAI got active, many states started thinking of better organisational forms than the Public Works Department for road development under its charge. Maharashtra was the first state to set up the Maharashtra State Road Development Corporation Limited (MSRDCL) in August 1996. The Mumbai-Pune Expressway was developed by the MSRDCL. Other states followed over the next decade. These corporations also promoted PPPs where possible. Some states are also developing Expressway-standard roads. Uttar Pradesh is a leader in this.
- **Starting the National Highways Development Project (NHDP):** This project was started under NHAI in 1998 and consequently grew to seven phases involving a total length of 49,260 km, focusing on almost the entire NH system as it existed then. Phase 1 consisted of four-laned the Golden Quadrilateral (GQ), connecting the four major metro cities. Phase 2 was four-laned, connecting the north-south and east-west corridors, connecting the extreme points of the country. There is an interesting story about how both phases 1 and 2 came to be announced simultaneously, while the original plan was only to announce the first phase. Atal Bihari Vajpayee, the then Prime Minister, while announcing the project, in his poetic style, said that the NHDP would enable connectivity from "Kashmir to Kanyakumari and Saurashtra to Silchar", while the initial focus was to be on the GQ, which had higher traffic. Thus, phase 2 was also announced. In 2018, with most of the NHDP having been completed, the remaining works were subsumed

under the larger *Bharatmala Pariyojana*.

- **Focus on Rural Roads through PMGSY:** This has been one of the more successful projects in India. It can be attributed to three reasons: (i) selection of villages for connectivity based on objective criteria; (ii) overseeing from independent agencies, including the World Bank; and (iii) 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. The PMGSY has also brought in state involvement for the maintenance of the roads. Given the interest in rural roads, the earlier classification of 'Other District Roads (ODR)' has been merged with rural roads since 2016.
- **Providing Viability Gap Funding (VGF):** The approach to the initial phases of NHDP was to leverage PPPs. However, PPPs were hardly forthcoming for the GQ as phase 1 got started due to high risk perceptions. The NHAI decided to do the bulk of the work through traditional contract means, with support from a road cess. In the meantime, based on discussions with stakeholders, including contractors who could be PPP players, the idea of mitigating risks by providing a VGF came up. In fact, this was the bidding criteria with a cap of 40% of the project cost. This created interest for the bidders and many projects after phase 1 were done through the PPP route. The idea of VGF has since been used by other infrastructure sectors.

- **Evolution of the Model Concession Agreement (MCA):** The first MCA for the road sector was brought out in 2000. Beyond the VGF, many other aspects of better allocation of risk between the PPP player and the authority were addressed over the past 10 years in a spirit of continuous improvement. These included issues such as (i) Revenue share over negative grant, (ii) Site handover to the extent of 80% of the requirement, (iii) Omnibus bipartite State Support Agreement over a case-by-case approach, (iv) Specifications and standards beyond the Indian Roads Congress (IRC) guidelines, (v) Security to lenders through an escrow account, (vi) Supervision by an Independent Engineer, (vii) Change of scope during the concession period, (viii) Change in ownership with a moratorium period, (ix) Breach of maintenance obligations, (x) Variations in traffic growth addressing both upside and downside, (xi) Overloading regulation and (xii) Termination conditions.
- **Focus on Expressways:** The first access-controlled expressway for fast and streamlined movement was opened between Mumbai and Pune in 2002. While the construction of expressways had a slow start, it has picked up in the past 10 years. As of August 2023, India has about 5000 km of operational expressways, with another 9000 km under construction. There are proposals for a further 20,000 km of expressways.
- **New Contracting Models and Asset Monetisation:** Apart from the classical tendering through the Engineering, Procurement, and Construction (EPC) or the PPP through the Build, Operate, and Transfer (BOT), the Hybrid Annuity Model (HAM) and Toll, Operate, and Transfer (TOT) have emerged as acceptable operating models over the past decade. In the HAM, there is better risk allocation to the private player, who must build and operate the road, without being vulnerable to toll revenues. Further, 40% of the capital cost is provided by the authority. The remaining 60% is paid to the private player over 30 years in biannual installments. In the TOT model, a built road is offered to the private player for toll collection and maintenance over the concession period. To enable asset monetisation of built roads, the idea of Infrastructure Investment Trusts (InVIT) has been operationalised.

- **Focussed Organisations:** Apart from the NHAI, organisations have been created for specific objectives. In December 2012, the Indian Highways Management Company Limited (IHMCL) was set up to carry out electronic tolling. This was followed by the National Highways and Infrastructure Development Corporation Limited (NHIDCL) to carry out road development projects in the border states. The National Highways Logistics Management Limited (NHLML) was set up in 2020 for developing Multi Modal Logistics Parks (MMLPs) and the first/last mile port connectivity projects.
- **Road-Making Technologies:** As the NHDP was rolled out, the import of road-making equipment was brought under the open general licence to make it easy for procurement. The manufacture of such equipment through technology transfer was also encouraged. The bidders for the GQ tenders had to be a consortium of an Indian and a foreign player, so that there could be learning from other countries.This has since not been mandatory. Over the years, we have learned to increase the rate of road surface construction (including setting records in the Samruddhi expressway), construct better bridges at a lower cost, and tunnel through mountains and environmentally sensitive areas. New and environmentally sustainable materials are being experimented with and used where they are found acceptable.
- **Electronic Toll Collection (ETC):** With the increasing number of toll plazas across the country, it became imperative to bring in ETC to reduce the toll collection time and consequent waiting. This had a slow start in the initial years, with 5% penetration by 31 March 2017, and then going up to 96% by 31 March 2022. The average daily ETC during 2021-22 was Rs 90 crore through 55 lakh transactions, at an average of a little over Rs 160 per transaction.This technology must further evolve, like in developed countries, to the point where vehicles need not slow down for the electronic payment but can have it done while travelling at the maximum speed.

While the above have facilitated road development in the country, there still are challenges.

- **Better Focus on Safety:** Road design and construction practices are the biggest causes of our unsafe roads, which kill the maximum number of people in a country. While we aspire for higher speeds on the road, the design and practices have not kept up. For example, there is rarely a buffer lane for a right turn to enable traffic to wait for the opposing traffic. Exits and entrances do not have buffer lanes, which could ensure streamlined turns. Crash barriers need improvement and immediate replacement when damaged. Roads for traffic diversion during construction are of poor quality, leading to congestion due to low speeds. Signages are not provided with scientific considerations of visibility to prepare the road user for a change in rhythm of their driving speed. Roadside parking is not provided as per user expectations and consequently is not regulated.
- **Urban Roads:** While long haul and even rural roads are getting attention, urban roads are not getting their due. This results in low speeds in urban areas, leading to significant wastage of time and poor first/last mile connectivity. Further, urban goods movement is treated poorly. Parking is a significant issue. There are co-ordination issues with urban public transport.
- **Lane Kilometres versus Road Kilometres:** As more and more multiple-lane roads get constructed, it is important to focus on the measure of lane kilometres rather than road kilometres. This will capture not only access but also capacity. Maps must also be fed with information on the number of lanes to enable road users to make better choices.
- **Origin to Destination (OD) Data:** For future planning of development of the road network, and even if required for traffic regulation, it is important to have OD traffic flow data. Such data collection can be integrated with ETC.
- **Better Co-ordination with PPP Players:** Significant time and energy is wasted in disputes between the PPP players and the authority. Many times, the consequential effect is on the road user. There are two-lane highways waiting to be made into four-lanes but cannot proceed due to contractual conflicts. Projects get delayed, leading to significant user inconvenience.

Given the traction that the country has built on road infrastructure, we would hope that the challenges are addressed and the momentum enhanced for development. ❑

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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.

The size of IR's fleet of locomotives as on 31 March 2022 consisted of 39 steam, 4,747 diesel, and 8,429 electric locomotives. The size of IR's wagon fleet consisted of 3,18,896 units – 70,555 covered, 1,76,574 open high-sided, 27,522 open low-sided, 25,946 other types and 16,004 brake vans/departmental wagons. Forty-four Loco sheds, 236 Carriage and Wagons sick lines and central repair depots provide repair and maintenance facilities for the entire fleet of rolling stock. About 74.06 per cent of the route kilometres, 80.38 per cent of the running track kilometres and 78.46 per cent of the total track kilometres are electrified. The network is divided into 17 zones.

The main objectives of railway planning have been to develop the transport infrastructure to carry the projected quantum of traffic and meet the developmental needs of the economy. Since the inception of the planned era in 1950-51, Indian Railways have implemented nine five-year plans, apart from annual plans in some years. During the Plans, emphasis was laid on a comprehensive programme of system modernisation. With capacity being stretched to its limits, investments in cost-effective technological changes become inescapable in order to meet the ever-increasing demand for rail transport. Along with a major thrust directed towards the rehabilitation of assets, technological changes and upgradation of standards were initiated in important areas of track, locomotives, passenger coaches, wagon bogie designs, signalling, and telecommunication.

Central Public Sector Enterprises

There are 12 Central Public Sector Enterprises under the administrative control of the Ministry of Railways, viz. (i) RITES Limited, (ii) IRCON International Limited, (iii) Indian Railway Finance Corporation Limited (IRFC), (iv) Container Corporation of India Limited (CONCOR), (v) Konkan Railway Corporation Limited (KRCL), (vi) Mumbai Railway Vikas Corporation Limited (MRVC) (vii) Indian Railway Catering & Tourism Corporation Ltd. (IRCTC), (viii) Railtel Corporation of India Ltd. (RCIL), (ix) Rail Vikas Nigam Ltd. (RVNL), (x) Dedicated Freight Corridor Corporation of India Limited (DFCCIL), (xi) Kolkata Metro Rail Corporation Limited (KMRCL), and (xii) Braithwaite and Company Limited (BCL).

Research & Development

The Research Design and Standards Organisation (RDSO) at Lucknow is the R&D wing of Indian Railways. It functions as a consultant to the

Zonal Railways	Headquarters
Central	Mumbai
Eastern	Kolkata
East Coast	Bhubaneswar
East Central	Hajipur
Northern	New Delhi
North Central	Allahabad (Prayagraj)
North Eastern	Gorakhpur
Northeast Frontier	Maligaon (Guwahati)
North Western	Jaipur
Southern	Chennai
South Central	Secunderabad
South Eastern	Kolkata
South East Central Railway	Bilaspur
South Western Railway	Huballi
Western	Mumbai
West Central Railway	Jabalpur
Metro Railway	Kolkata

Indian Railways in technical matters. It also provides consultancy to other organisations connected with railway manufacture and design. Recently, RDSO successfully conducted Balancing Speed and controllability trials of Vande Bharat Express between Kasara Igatpuri and Karjat Lonavala sections of the Central Railway. RDSO and IIT, Kharagpur has indigenously developed automation tool (SigDATE) for the generation of route control chart for Electronic Interlocking systems.

Railway Finance

Though a part of the overall financial figures of the Government of India, the Railway Budget was being presented separately to Parliament since 1924-25 owing to the Separation Convention of 1924. The main reason behind the Separation Convention was to secure stability for civil estimates, as railway finance used to be a sizeable part of the general finances. The Government decided to merge the Railway Budget with the general Budget from the Budget Year 2017-18. The unified budget brings the affairs of the Railways to centre stage and presents a holistic picture of the financial position of the Government. This merger would facilitate multimodal transport planning between Highways, Railways and Waterways. Railways would continue to maintain its distinct entity as a departmentally run commercial undertaking and retain its functional autonomy, delegation of financial powers, etc., as per the existing guidelines. Instead of the erstwhile scheme of sixteen demands for grants, the Ministry of Finance has introduced one demand for grants for the Ministry of Railways.

Railway Electrification

Indian Railways' Mission 100% Electrification policy is seen as pivotal for the country's entire energy sector. The Government initially stepped up the rate of railway electrification in order to reduce crude oil imports and save foreign exchange payments. However, there has been growing recognition that it will deliver significant environmental benefits. In performance terms, electric traction provides users with a better quality of service. The higher power of electric locomotives increases the average speeds and loadings for both freight and passenger trains, which in turn offers a tremendous opportunity to modernise railways and support economic development. Electrification will meet the aspirations of its citizens to provide clean transport by reducing carbon footprint and providing the country with an environmentally friendly, green, and clean mode of transport.

For a long time, the railway was largely fueled by coal and diesel, but electrification has been growing steadily since independence in 1947, but the past seven years have seen some remarkable transformation. Since then, the focus has been on delivery, with the rate of commissioning ramped up to complete the network one by one.

By March 2023, electrification on Indian Railways had been extended to 58,812 (Route Kilometers) RKMs including Konkan Railway. This constitutes 90% of the total BG Railway Network.

Rail Tourism

Indian Railways (IR) is the prime mover of tourism in the country by connecting various tourist destinations across the country by rail. The IR have introduced theme-based Tourist Circuit Trains under the Bharat Gaurav Trains Policy with an objective to showcase India's rich cultural heritage and magnificent historical places to the people of India and the world through professionals of the tourism sector and other potential service providers.

Under the said policy, the State Governments, State Tourism Development Corporations or any other potential service provider may run theme-based tourist circuit trains covering any destinations of their choice. The Service Provider offers a comprehensive package with facility of rail transportation, accommodation, meals, local road transport, sightseeing, etc.

The Ministry of Railways have decided to give a concerted thrust to efforts for promotion of domestic tourism through provision of better quality LHB coaches under the Bharat Gaurav Train policy and give approximately 33% concession in the charges due to the Railway, for promotion of rail-based tourism under Bharat Gaurav Train scheme. In addition, specialised tourism products, mostly train based, are also introduced from time to time in association with Indian Railway Catering and Tourism Corporation and selected State. ❑

Source: Indian Railways

NATIONAL RAIL PLAN

Indian Railways has prepared a National Rail Plan (NRP) for India – 2030. The plan is to create a 'future-ready' railway system by 2030. The NRP is aimed at formulating strategies based on both operational capacities and commercial policy initiatives to increase the modal share of the railways in freight to 45%. The objective of the plan is to create capacity ahead of demand, which in turn would also cater to future growth in demand right up to 2050, increase the modal share of railways to 45% in freight traffic, and continue to sustain it.

Vision: To develop capacity and infrastructure and enhance rail freight share ahead of demand. Develop capacity by 2030 that will cater to growing demand up to 2050. The key objectives of the National Rail Plan are:

- Formulate strategies based on both operational capacities and commercial policy initiatives to increase the modal share of the railways in freight to 45%.
- Reduce transit time of freight substantially by increasing the average speed of freight trains to 50 kmph.
- As part of the National Rail Plan, Vision 2024 has been launched for the accelerated implementation of certain critical projects by 2024, such as 100% electrification, multi-tracking of congested routes, upgradation of speed to 160 kmph on Delhi-Howrah and Delhi-Mumbai routes, upgradation of speed to 130 kmph on all other Golden Quadrilateral-Golden Diagonal (GQ/GD) routes, and elimination of all Level Crossings on all GQ/GD route.
- Identify new Dedicated Freight Corridors.
- Identify new High Speed Rail Corridors.
- Assess the rolling stock requirement for passenger traffic as well as wagon requirement for freight.
- Assess the locomotive requirement to meet twin objectives of 100% electrification (Green Energy) and increasing freight modal share.
- Assess the total investment in capital that would be required, along with a periodical breakup.
- Sustained involvement of the Private Sector in areas like operations and ownership of rolling stock, development of freight and passenger terminals, development and operations of track infrastructure, etc. ❑

Source: PIB

VANDE BHARAT EXPRESS TRAINS

The Government has dedicated significant efforts towards strengthening the 'Make in India' campaign. As an excellent example of the 'Make in India' success story, the Indian Railways launched India's first indigenous semi-high-speed train, Vande Bharat Express. The first Vande Bharat Express train was flagged off on 15 February 2019, on the New Delhi-Kanpur-Allahabad-Varanasi route.

This train has been introduced to upgrade maintenance technologies and methodologies and achieve improvement in productivity and performance of all railway assets and manpower in which inter-alia would cover reliability, availability, utilisation, and efficiency.

This train is India's first semi-high-speed train equipped with world-class passenger amenities. It can achieve high speeds due to faster acceleration & deceleration and will reduce journey time by 25% to 45%.

With a view to providing better travel experience to the passengers, Indian Railways has introduced Vande Bharat trains with modern coaches having the following enhanced safety features and amenities:

1. Faster acceleration and semi-high-speed operation up to 160 km/hr.
2. Fully sealed gangway for free passenger movement
3. Automatic plug doors
4. Reclining ergonomic seats and comfortable seating with revolving seats in executive class.
5. Better ride comfort.
6. Mobile charging sockets for every seat.
7. Mini pantry with provision of hot case, bottle cooler, deep freezer & hot water boiler
8. Direct and diffused lighting.
9. For Divyangjan passengers, special lavatory in DTC.
10. Emergency openable windows and fire extinguishers in each coach
11. CCTVs in all coaches
12. Emergency alarm push buttons and talk back units on all coaches.
13. Better fire safety – Aerosol-based fire detection and suppression system in electrical cabinets and lavatories
14. Driver-Guard communication with voice recording facility & crash hardened memory
15. Coach Condition Monitoring System (CCMS) display with remote monitoring
16. Disaster lights – 4 numbers in each coach in case of Emergency
17. Four platform side cameras including rear view cameras outside the coach.

As of 28 July 2023, 50 Vande Bharat train services are running on the Indian Railways, connecting states having Board Gauge (BG) electrified network.

The introduction of trains, including Vande Bharat services, is an ongoing process on Indian Railways subject to operational feasibility, traffic justification, etc. India's first-ever indigenously designed and manufactured semi-high speed Vande Bharat trains have provided a modern and comfortable rail travel experience to passengers. High speed, enhanced safety standards, and world-class service are the hallmarks of this train. ❑

Source: PIB

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YE-2456/2023

India's G20 Presidency

Inclusive, Ambitious, Decisive and Action-oriented

The 18th G20 Summit held in New Delhi on September 9th and 10th, 2023 was a clear indicator of Bharat turning over a new leaf in its long history of international relations. Headed by Prime Minister Narendra Modi, the theme of the G20 summit was "Vasudhaiva Kutumbakam", which translates to "The world is one family", which was evident in all the diplomatic goals achieved by Bharat in two days. From announcing an international corridor, which resuscitates the revered Spice Route of old times, to bringing focus back on sustainable development through the Global Biofuel Alliance, leaders across the globe have applauded PM Modi's approach of diplomacy, non-alignment, and growth for all.

The 21st century is a time that has the potential to give a new direction to the entire world. It's a time when years old challenges demand new solutions from us. Therefore, we must move forward by fulfilling all our responsibilities with a Human Centric approach.

- PM Narendra Modi

India's Push for Clean Energy

Global Biofuels Alliance (GBA)

Announced by the PM Modi-led government during

India Energy Week 2023

- Formally inaugurated on 9th September 2023

19 countries have joined GBA, along with 12 international organisations

GBA will also help accelerate India's existing biofuels programs such as

PM JI-VAN Yojana, SATAT & GOBARdhan scheme

increasing farmers' income, creating jobs and enhancing overall development

20% Ethanol blending, or E20, is estimated to save around **₹ 30 thousand crore annually**

cbc 22201/13/0052/2324

G21: Addition of the African Union (AU)

On 9th September 2023, the **AU became a permanent member** of G20 under the presidency of India led by PM Modi

Announced in the inaugural session of the two-day summit, PM Modi welcomed the **55-nation union,** making it **the second regional bloc** to become a permanent member after the EU

Reimagining the Spice Route India-Middle East-EU Corridor (IMEC)

UAE	**$76.9 billion worth** of bilateral trade between May 2022 & March 2023
Jordan	**$4.4 billion worth** of bilateral trade, an increase of 63% over the preceding year
Israel	Bilateral trade worth over **$10 billion,** excluding defence in 2022-23
EU	**$116 billion worth** of trade in goods in 2021-22, accounts for 10.8% of India's total trade
Saudi Arabia	**$42.8 billion worth** of bilateral trade in FY 2021-22

G20 Delhi Declaration Diplomatic Progress

DELHI DECLARATION acknowledges a defining moment in India's journey to become a global leader

CONSENSUS ACHIEVED on achieving SDGs, eliminating hunger and malnutrition, education, global economic challenges and many other key issues

ADDRESSES POLITICAL, ECONOMIC & ENVIRONMENTAL CHALLENGES

YE-2477/2023

New India's mantra: Reform, Perform and Transform

Prime Minister Narendra Modi's Independence Day speeches have aimed at engaging with the nation. As he addressed the public from the ramparts of the Red Fort for the 10th time, he referred to them as 'parivaar jan', a sign that he regards Indians as his chosen family. With the longest average duration among all previous Indian Prime Ministers, his speeches averaged 83 minutes. By doing so, he demonstrated his commitment to communicating with the nation about his government's performance, India's progress in transformation, and his vision for a Vikasit Bharat. Presented below are some highlights based on his latest speech on India's Independence Day, blending India's past achievements with reminders of our duties in the Kartavya Kaal.

> "Today we have **Demography**, **Democracy** and **Diversity**, and this **'Triveni'** has the potential to make every dream of India come true."
>
> Prime Minister Narendra Modi

Highlights from the 77th Independence Day Speech

Nurturing Reverence for our National Heroes who helped us

PM Modi remembered the revered Nation Builders.

Vishwa-Mitra Bharat

Mother of democracy now leads the world order, as India advocates for new stability that is fruitful for humanity.

Sins of Appeasement, Corruption, Dynasty

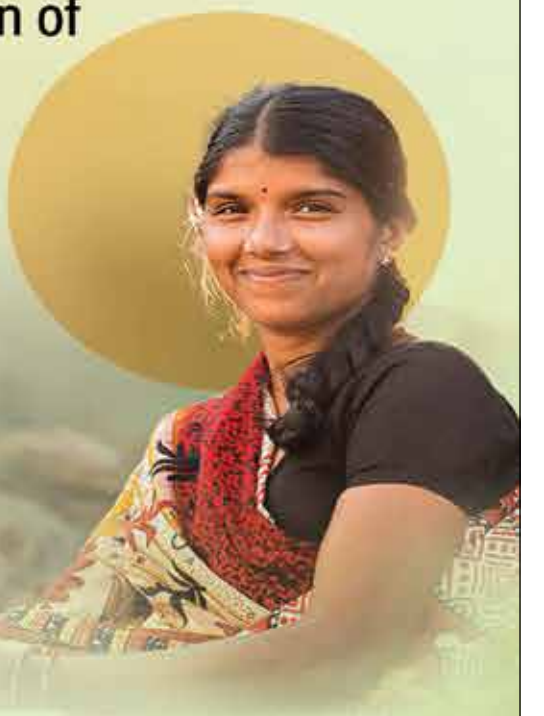
The sins endanger the idea of Bharat, PM Modi ensured to end it for the growth of the nation.

A Millennium Lost, a Millennium to Look Forward to

India's development was ruined by 1,000 years of subjugation however the coming thousand years will be different as India will rise to newer heights.

Resolutions of 77th INDEPENDENCE DAY

Encapsulating the transformation of **Vikasit Bharat** in the 77th Independence Day Speech



- Rs. 20 lakh crore+ in loans disbursed **under MUDRA Yojana** and **8 crore new entrepreneurs.**
- **Savings of Rs. 20,000 crore** with low cost, high quality medicines under **Jan Aushadhi Kendras.**
- Ease of Doing Business enables India to become the **3rd Largest Startup Ecosystem of the world.**
- Honouring our Bravehearts with **One Rank One Pension** by providing Rs. 70,000 crore to soldiers.
- **13.5 crore people lifted from Poverty** (in just 5 years) who entered the neo-middle class.
- **Central Government devolution to State Governments increased** from Rs. 30 lakh crore to Rs. 100 lakh crore, indicating government's commitment towards **co-operative federalism.**
- **Over 4 Crore houses sanctioned under PM Awas Yojana.** Spending on affordable housing increased from Rs. 90,000 crore to Rs. 4 lakh crore.
- **Local development spends increased** from Rs. 70,000 crore to Rs. 3 lakh crore. No more glitches due to lack of budget, the only path now is local development.
- **Rs. 2 lakh crore spent for tap water connections** under Har Ghar Jal of the Jal Jeevan Mission.

- **Interest subsidy on bank loans** for urban poor living in urban slums, chawls, rented houses, unauthorised colonies.
- The Government has announced to **increase the number of Jan Aushadhi Kendras** from 10,000 to 25,000 for sale of medicine at reasonable prices benefiting the poor.
- Government announced to provide **skill development to 2 crore women** from rural areas to encourage them for starting micro-enterprises under **'Lakhpati Didi'.**
- Government has announced **15,000 women Self-Help Groups (SHGs)** would get agri-drones.
- **Vishwakarma Yojana,** financial outlay of Rs. 13,000 crore where 18 Traditional trades to be covered in 1st instance

CBC 22201/13/0046/2324

YE-2470/2023

India's foray into the vast expanse of space has been nothing short of remarkable, capturing the imagination of the world and showcasing the nation's commitment to scientific exploration and technological innovation. The Indian Space Research Organisation has steadily evolved into a global space powerhouse with the objective of enhancing the overall progress of India through the most effective and efficient utilisation of space sector applications.

This transformation has been made possible through unwavering government support that has consistently nurtured and propelled India's space missions to new heights.

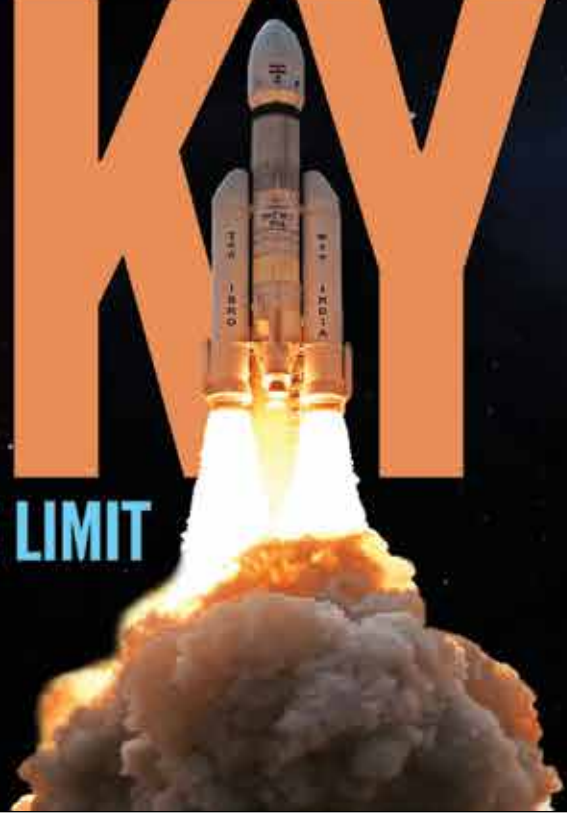
Under the visionary leadership of Prime Minister Narendra Modi, the importance of space exploration as a catalyst for national development has been recognized. His tryst with the space sector began when he was the Chief Minister of Gujarat. His vision ensured that space sector applications were translated into solutions for effective governance. The same technology is being leveraged in PM Gati Shakti, where space technology is extensively used for planning and executing infrastructure projects seamlessly. Only visionary leaders can understand that space technology and exploration are keys to unlocking mysteries in space and accelerating effective governance on Earth.

> *"India is on the Moon. We have our national pride placed on the Moon. We reached the spot where no one had ever reached before. We did what no one had ever done before. This is today's India, fearless India, warrior India.*
>
> *- Prime Minister Narendra Modi, 23rd August 2023*

PM Modi highlighted that, India's successful moon mission is not India's alone, it is India's human-centric approach that has been welcomed universally and our moon mission is also based on the same human-centric approach and hence this success belongs to all of humanity.

PM Modi is confident that all countries in the world, including those from the Global South, are capable of achieving such feats and like India all can aspire for the moon and beyond.

SKY IS NOT THE LIMIT



Chandrayaan 3

Big Bang Moment for ISRO and India

- First country to reach lunar south pole.
- Fourth country globally to reach moon.
- **23rd August** declared as the National Space Day celebrating Chandrayaan 3 landing.
- Laser-Induced Breakdown Spectroscope (LIBS) instrument onboard the Rover Pragyan unambiguously confirms the presence of Sulphur (S) in the lunar surface near the south pole.

Chandrayaan-3 on Moon surface

India's 2 Decades of Moon Voyage

Unravelling the Lunar Mysteries

Chandrayaan 1

The Maiden Flight

- Prime Minister Atal Bihari Vajpayee announced the Chandrayaan project on 15 August 2003. Launched in October 2008 it operated until 2009.
- Objective - Orbiting Moon for upgrading and testing technological capabilities in space.
- Cost - Rs. 386 crore.

Chandrayaan 2

An Attempt to Remember

- Launched in July 2019.
- Objective - To soft-land on the lunar surface and operate a robotic rover on the surface.
- Cost - Rs. 603 crore

Chandrayaan 3

Lightening the Dark Side

- Launched on 14 July 2023.
- Objective - Safe and soft landing on moon, through Vikram Lander, validating capabilities of Pragyan rover and to conduct in-situ scientific experiments.
- Cost - Rs. 615 crore.
- Landing point - **Shiv Shakti Point.**

PM Modi inspecting a model of the Vikram Lander part of the Chandrayaan-3 mission at the ISTRAC, Bengaluru.

ISRO's Space Record of Last 9 years

- Out of 431 foreign satellites, 396 were launched in the last nine years by India.
- 396 foreign satellites were launched, earning Rs. 3,300+ crore in just 9 years.
- In 2017, India launched a record 104 satellites, out of which 101 belonged to international customers, creating a world record.
- India's space sector budget soars from Rs. 5,615 crore to Rs. 12,543 crore in last decade providing better infrastructure.
- ISRO launch rate skyrockets from 1.2 yearly launch missions before 2014 to an impressive 5.7
- ISRO's launch tally for student satellites increases from 4 before 2014 to 11 since 2014 manoeuvring young minds towards the infinite possibilities of space.
- 160+ new startups have come up in space sector manoeuvring the space ecosystem to new heights.

Defying Gravity, Space Sector of India

- IN-SPACe established to create an eco-system of industry, academia, and start-ups.
- Vikram-S, India's first privately built rocket, was launched successfully.
- India's 1st private launchpad and mission control center established by Agnikul Cosmos.
- Aditya L1, first space-based observatory-class Indian solar mission to study the Sun, launched in September 2023.
- In near future, Gaganyaan project envisages human spaceflight capability.

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From Takkar 2023 PT Test Series (also Panchsutra)

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YE-2468/2023

PORT INFRASTRUCTURE IN GUJARAT

PM GatiShakti National Master Plan which has the objective of increasing logistical efficiency, also includes comprehensive Port connectivity projects. The Gujarat Maritime Cluster aims to bring together the maritime service providers, financial institutions, the relevant government regulatory agencies and academicians to accelerate integrated maritime sector development. In order to develop port sector, Gujarat aims to create a maritime environment that boosts confidence in global maritime players, attracts investment, provides stability, and creates a world-class competitive maritime ecosystem.

SK MEHTA | The author is an IFS and Chairman, Deendayal Port Authority, Kandla. Email: chairman@deendayalport.gov.in

Gujarat is one of India's most industrialised states and is a leading hub for manufacturing chemicals, petrochemical, dairy, pharmaceuticals, cement, ceramics, textiles, gems and jewellery and engineering in India[1]. Industrialisation has been a driving force behind transport and logistics infrastructure development. Gujarat's strategic location with longest coastline in India of 1600 km and connectivity to all the major port-based trade routes, such as the USA, Canada, Europe, Australia, China, Japan, Korea, Gulf and African countries keeps it at the forefront for leading Maritime development in Arabian Sea and Indian Ocean[2].

The State comprises 49 ports i.e., 1 major port, Deendayal Port Authority and 48 non-major ports, geographically dispersed across south Gujarat, Saurashtra and Kachchh region and accounts for ~40% of all cargo handled at the Indian port[3]. It is also the first state in India to enact a legal framework for Public-Private-Partnership in infrastructure sector[4]. Further, the Gujarat Government has started its own viability gap funding scheme for infrastructure projects[5].

Gujarat with a GSDP of INR 19.44 lakh crore in 2021-22 in nominal terms constituted 8.21 per cent of India's GDP[6]. For the FY 2023-24, over INR one thousand crore has been allocated to Gujarat from Central Government funds for as many as 12 port projects under SagarMala Port development projects[7].

Logistical Infrastructure development

The port capacity utilisation of non-Major ports in Gujarat in the FY 2019 was 542 MMT and is anticipated that the port traffic will reach above ~750 MMT by FY2027[3]. Whereas, the existing (FY 2023-24) port capacity of the only major port of Gujarat i.e. Deendayal Port Authority is about 282 MMT and is estimated to reach ~392 MMT by the year 2030. Thus, several greenfield and brownfield capacity augmentation projects of ports across the coastline of Gujarat has been proposed which will support in economic development of the state. Following are few areas of development[3]:

- **Development of greenfield liquid terminals/ berths** to cater increasing LPG imports along with blending facilities at South and Central Gujarat chemical manufacturing and trading belt.
- **Development of satellite ports** for increasing trade with western coastal states i.e., Maharashtra, Karnataka, Kerala, etc. which will support coastal shipping for holistic port development and reduce road congestion owing to traffic growth as well as carbon footprint of the state.
- **Development of Grade A warehousing**; **rail freight terminals or Multi Modal Logistics Parks** complementing the Special Investment Regions/ Industrial parks in the State and Port led industrial clusters to enable EXIM trade ecosystem and increase port throughout in the logistics sector in Gujarat.
- **Improvement in the road/rail connectivity of ports** in Gujarat for multi-modal and uninterrupted cargo traffic movement.

PM GatiShakti National Master Plan which has the objective of increasing logistical efficiency, also includes comprehensive Port connectivity projects. Being the Chairperson of GatiShakti's Multimodal Committee of Gujarat for framing Port Connectivity Master Plan, I would like to write few facts. Gujarat has 23 projects among the 174 Port Connectivity Projects in India. Following are three Road and Rail connectivity projects:

1. Upgradation of Tuna Road from Two Lane to Four Lane; Doubling and electrification of existing Tuna-GIMB line to cater railway traffic of newly developed facilities at Tuna-Tekra for Container Terminal and Multipurpose Cargo berth up to the take-off point.
2. Widening of 23 km approach road to all weather Navlakhi Port in Gujarat.
3. Rail connectivity and capacity augmentation for Nargol port to dedicated freight corridor.

Greenfield projects (Ports under development)
• Tuna Tekra: Developed by Deendayal Port Authority (DPA) as the container port with capacity of 2.19 MTEU
• Chhara: Developed by GMB with 1 no. of Coal berth of 8 MMTPA capacity in initial phase.[8]
• Dahej: The port is being developed by GMB with the total port capacity in Phase I & II of 41 MMTPA.[8]
• Nargol: Developed by GMB for facilities of Container and Bulk cargo berth, with the total port capacity of around 10 MMTPA.[8]

The State has evolved Petrochemical infrastructure at Ports. There are three LNG Terminals namely, Dahej (17.5 MMTPA), Hazira (5 MMTPA) and Mundra (5 MMTPA). These are connected with established Gas Transmission and Distribution Network (Grid) across the state[9]. Dahej is also India's first dedicated Chemical port[8].

Sustainable Infrastructure Development

Gujarat is the leader in the installed electricity generation capacity with 37.35 GW in 2023[10]. Among this 16.34 GW/ 43.74% is from renewable energy. The state happens to have second highest Wind energy generation capacity with 9.21 GW, mostly situated along the coast[11].

Gujarat along with Tamil Nadu are the two states where Ministry of New and Renewable Energy has proposed development of offshore wind farms to boost the blue economy and renewable energy sector[12]. Mithi Virdi, south of Bhavnagar, has been proposed to be a potential location for development of port to service 20 GW offshore power plant for logistics requirements of wind power project[3].

Green Hydrogen/Ammonia has been proposed in the period of 2025-2030 at Kandla, Paradeep and Tuticorin. Several measures have been taken towards reduction in environmental pollution, improvement in solid waste management, achieving water neutrality, green infrastructure development within the port premises and along the coast. These are been undertaken in consultation with various research institutes of repute viz. Gujarat Institute of Desert Ecology, Gujarat Ecology Commission, Gujarat Environmental Management Institute, The Energy and Resources Institute, etc. in line with the key interventions identified in Maritime India Vision, 2030 towards Sustainable and Green Ports.

Swachh Bharat, Special Campaign 3.0, promotes sustainability. For creation of Clean and Sustainable Port City, project such as 'Swachh Gandhidham' is being proposed by DPA in collaboration with Gandhidham Municipality. It has two major components, IEC (Information, Education and Communication) Activities on solid waste management to the residents of City and commissioning of dry and wet waste processing plants. The project also has scope of developing the Construction and Demolition Processing Plant in future.

Strategic Developmental Projects

Marine Shipbuilding Parks

There are currently nine operational shipbuilding yards in Gujarat. Besides, eight ship building yards are under execution and six under the process of approval. It is envisaged to develop a cluster-based shipyards or Marine Shipbuilding Park (MSP) within a stretch of 5 to 8 km along the waterfronts of Gujarat coasts. Two locations for the same has been approved along the Gujarat Coast viz. North bank of Narmada River in Dahej region ('Dahej Shipbuilding cluster') and Old Bhavnagar port[8].

The Government of India's Shipbuilding Financial Assistance Policy[13] also aims to provide financial assistance to Indian shipyards for shipbuilding contracts signed between 1 April 2016 to 31 March 2026, including the said dates. The financial assistance will be 20% of the 'Contract Price' or the 'Fair Price', whichever is lower, as determined by international valuers, for any vessel built in India subsequent to its delivery. 2018-19 onwards, the quantum of financial assistance shall reduce by three percent after every three years of the policy.

Gujarat Maritime Cluster

The Gujarat Maritime Cluster aims to bring together the maritime service providers, financial institutions, the relevant government regulatory agencies and academicians to accelerate integrated maritime sector development in the State. Gujarat International Maritime Arbitration Centre, a first of its kind to manage arbitration and mediation proceedings with disputes related to the maritime and shipping sector will be developed

in the GIFT city. The other agencies involved are Gujarat Maritime Board, International Financial Services Centres Authority, Gujarat International Finance Tec-City and Gujarat Maritime University[2]. The services provided by the first ever commercial maritime cluster being developed by Gujrat Port and Infrastructure Development Company Ltd. of GMB at GIFT City for Regulators and Trade Association as well as Ports, Shipping & Logistics related businesses are:

- Support services (Maritime, Education, Research, Media, etc.)
- Intermediate Services (Insurers, Legal Advisors, Consultants, etc.)
- Banks and Financial Institutions

The State Government has also planned to establish a Shipbuilding University in the district of Kachchh[5].

Strengthening of Policy and Institutional Framework

To develop port sector, it requires creating a maritime environment that boosts confidence in global maritime players, attracts investment, provides stability, and creates a world-class competitive maritime ecosystem. The following policies have been framed that have been a key enabler for trade and investment in the State:

Port Policy, 1995[14]	The Policy integrates the development of ports with industrial development, power generation, and infrastructure development.
BOOT Policy, 1997[15]	The BOOT principles serve as a framework for involvement of private sector in the construction and operation of the new ports.
The Gujarat Infrastructure Development Act, 1999[16] and its Subsequent amendment, 2006[17]	An ACT to provide for a framework for participation by persons other than the State and other Government agencies in financing, construction, maintenance and operation of infrastructure projects. Hence, establishes the Board for appraisal and resolution of related matters.
Shipbuilding Policy, 2010[18]	To streamline and integrate development in shipbuilding sector to optimise utilisation of available and planned infrastructure
Ship Recycling Regulations, 2015[19]	Conditions and procedures for grant of permission to Ship recycling plot on the basis of its utilisation

Initiatives for Strategic Planning

All the major ports are in the final stage of formulating Port Masterplan 2047 which will soon be launched. Similarly, States are also preparing their Port Master Plans 2047. This is being framed to increase the Port capacity from 2600 MMTPA to more than 10,000 MMTPA by 2047. The Masterplan is on concept of Port-Led development and the projects identified there under, are focused on

Port Modernisation, Port Connectivity, Port-led Industrialisation, Coastal Community Development, Coastal Shipping, and Inland Water Transport.

The coastal development of Gujarat is not just limited to industrial and logistical aspects. For example, under the governance of Deendayal Port Authority, a Smart Industrial Port City is being developed at Kandla-Gandhidham. This envisages the industrial development along with planned residential complexes to ensure sustainable city planning. Similarly, 3 Coastal Economic Zones are being proposed under Sagarmala Project in Gujarat, namely at Kachchh, Saurashtra and Suryapur[20]. This will ensure the equitable growth of the long coastline. The effort by Ministry of Tourism and Ports along with Shipping and Waterways in the creation of theme-based cruise circuit as Gujarat Pilgrimage tours will bring interconnectivity along the coastline. The operational Ro-Ro/Ro-Pax circuit at Hazira-Ghogha[21] and the ongoing construction at Muldwarka will make Water transport as the preferred choice of commutation.

Easing the investment mechanism, Government has allowed 100% Foreign Direct Investment (FDI) in the shipping sector. 100% FDI is allowed under the automatic route for projects related to the construction and maintenance of ports and harbours. There are tax exemptions from Customs and Excise duties on inputs used in shipbuilding[22].

The Port Infrastructure development in Gujarat initiated as the need and is currently inclined towards creating a sustainable infrastructure. With the increasing share of renewable energy, promotion of circularity and inclusive infrastructure planning etc. is creating a liveable society. The coastal development with Gujarat Maritime Cluster, Smart Industrial Port City and research/academic institutes lays the foundation for taking next step in creating interconnected world. ❑

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UNITY MALLS

Unity Malls – a unique initiative of the Government of India, is poised to play pivotal roles in fostering economic development, providing citizens with recreational spaces, enhancing tourism, and celebrating the rich cultural heritage of our diverse and unique nation.

DR SAJJAN SINGH YADAV | The author is Additional Secretary, Department of Expenditure, Ministry of Finance, GoI. Email: jspfs-doe@gov.in

The Unity Malls will serve as comprehensive marketplaces within the States, specifically curated for One District One Product (ODOP), products bearing a Geographical Indicator (GI) tag, and locally-crafted handloom and handicraft items.

Multifaceted Initiative

In her Budget Speech for fiscal year 2023-24, the Union Finance Minister unveiled a remarkable initiative—the establishment of a 'Unity-Mall' in each State of the country. These malls are envisioned to be strategically located, preferably in

the respective State capitals. However, States have been granted the autonomy to select either their financial capital or one of their prominent tourism centres as the site for this project.

This initiative is an integral component of the Union Government's commitment to advancing infrastructure development throughout the country and stimulating capital investment within the States. Furthermore, it is designed to foster national unity, expedite progress towards the 'Make in India' and 'Atmanirbhar Bharat' initiatives, offer local artisans opportunities to showcase and sell their products, create employment opportunities, facilitate skill development, champion local cuisine, celebrate cultural heritage, bolster tourism, and ultimately contribute to overall economic prosperity.

A GI tag provides assurance of the product's quality and unique characteristics associated with its origin in a well-defined geographical area, region, or country. This designation functions as a trademark both in domestic and international markets, offering valuable information about the product's geographical source.

To showcase the rich tapestry of special products from various districts within the State, each mall will have a dedicated shop for every district. Additionally, each Unity Mall will allocate one shop to each State in India, enabling the sale of their GI products, ODOP offerings, and other prominent regional products.

The ODOP initiative, spearheaded by the Government of India, aims to invigorate local manufacturing, create job prospects, mitigate economic disparities, and stimulate equitable regional growth across every district in India. As part of this endeavour, a distinctive product with unique qualities and cultural significance is carefully chosen, branded, and actively promoted. To date, more than 1100 products have been identified and championed through this initiative nationwide.

A Geographical Indication (GI) signifies the specific country or place of origin for a product. Generally, a GI tag provides assurance of the product's quality and unique characteristics associated with its origin in a well-defined geographical area, region, or country. This designation functions as a trademark both in domestic and international markets, offering valuable information about the product's geographical source. GI tags can be conferred upon agricultural, natural, or manufactured products.

The Scheme for Special Assistance to States for Capital Expenditure was originally introduced during the fiscal year 2020-21. It was launched to stimulate capital expenditures by State governments, recognising their resource limitations due to the impact of the Covid-19 pandemic. The scheme's primary objectives include harnessing the significant multiplier effect of capital expenditure, bolstering the future productive capacity of the economy, and fostering a higher rate of economic growth. The scheme garnered a positive response from State governments and has become a recurring feature in successive budget announcements.

Under this scheme, States receive funds in the form of an interest-free loan that is to be repaid after 50 years. Importantly, these loans do not count towards the annual borrowing ceiling of the States. The Scheme for Special Assistance to States for Capital Investment 2023-24 encompasses multiple components and has a total financial allocation of Rs 1.3 lakh crore. Notably, a substantial sum of Rs 5,000 crore has been specifically earmarked to extend financial support to States for the construction of Unity Malls. This amount has been allocated to States based on the number of districts. States are to provide land for the malls free of cost and may also allocate additional funds for the project from their budget. State-wise allocation of funds for Unity Malls by the Government of India is given in Table-1.

Mall Design and Amenities

The Department of Expenditure in the Ministry of Finance, Government of India, has issued comprehensive guidelines to States regarding the construction of Unity Malls. These guidelines

Table – 1: State-wise allocation of funds for the construction of Unity Malls

S. N.	Name of State	Allocation (Rs in crores)
1	Andhra Pradesh	172
2	Arunachal Pradesh	188
3	Assam	226
4	Bihar	223
5	Chhattisgarh	202
6	Goa	100
7	Gujarat	202
8	Haryana	155
9	Himachal Pradesh	132
10	Jharkhand	163
11	Karnataka	193
12	Kerala	120
13	Madhya Pradesh	284
14	Maharashtra	215
15	Manipur	149
16	Meghalaya	132
17	Mizoram	127
18	Nagaland	145
19	Odisha	189
20	Punjab	159
21	Rajasthan	202
22	Sikkim	106
23	Tamil Nadu	223
24	Telangana	202
25	Tripura	114
26	Uttar Pradesh	382
27	Uttarakhand	136
28	West Bengal	159
	Total	**5000**

emphasise that the architectural design of these malls should symbolise India's unity and grandeur. To ensure uniformity and cohesive branding, Unity Malls across the nation are required to adhere to a standardised signage design, as prescribed by the Department for Promotion of Industry and Internal Trade (DPIIT), Government of India. The design should incorporate the One District One Product (ODOP) logo and the Make in India logo. Additionally, States are encouraged to explore the use of multilingual signage, showcasing India's rich linguistic diversity.

The guidelines further stipulate that each Unity Mall must include a minimum of 36 commercial spaces, with one designated for each State or Union Territory (UT) for the sale and promotion of ODOP products. To ensure equitable representation of the nation's diversity while promoting national unity, these commercial spaces should have uniform floor space and be subject to consistent rental provisions. Additionally, each Unity Mall should allocate commercial spaces of equal size for every district within the State, including those districts that have been announced but not yet formally notified. The mall's design should also incorporate flexibility to accommodate the expansion of commercial spaces as needed.

The Unity Malls are expected to encompass a range of essential features, including a state-of-the-art food court, ample parking facilities, and purpose-built spaces for recreational and cultural activities, all tailored to their respective scales. Functional areas for conferences, events, galleries, and exhibitions should also be incorporated into their design. Moreover, these malls should offer technology-driven experiences such as virtual reality, augmented reality, digital displays, and interactive kiosks. Special attention must be devoted to ensuring convenience and accessibility in compliance with National Building Code standards.

To ensure the thriving success of the Unity Mall, States have been urged to extend financial assistance to facilitate the participation of sellers from distant regions and remote districts. Additionally, States are encouraged to undertake promotional initiatives aimed at establishing Unity Malls as vibrant cultural hubs and attractive tourist destinations. Furthermore, States are expected to take proactive steps to empower local ODOP sellers by implementing capacity-building programs.

To ensure the long-term sustainability of Unity Malls, their operation and maintenance will be structured under a Public-Private Partnership

Proposed Unity Mall in Raipur, Chhattisgarh

Proposed Unity Mall in Ujjain, Madhya Pradesh

model. In this arrangement, ownership of the mall will remain with the State government, while operational and maintenance responsibilities will be entrusted to a private party. A concession period of 30 years has been recommended for this purpose. States are advised to provide a Model Concession Agreement along with a Detailed Project Report (DPR) for the mall. The agreement should explicitly define the roles and responsibilities of each party involved and specify the financial arrangements. Furthermore, States are expected to commit to covering the operational expenses of the malls if such support becomes necessary.

In the event that a State or district chooses not to participate in the Unity Mall, the private party responsible for the mall's operations will actively seek out sellers who can showcase and sell ODOP products in the commercial spaces designated for that specific State or district. The selection of sellers will be based on their capacity to cater to both domestic and international tourists, and they will receive training accordingly. Additionally, the guidelines account for artisans who may not secure a dedicated space within the mall. Exhibition spaces will be periodically allocated to these ODOP artisans, allowing them to display and sell their products.

Approval Procedure and Status of Implementation

State Governments have been requested to submit their Unity Mall DPRs to the DPIIT under the Ministry of Commerce & Industry. DPIIT meticulously evaluates these DPRs and subsequently recommends an amount, not exceeding the amount allocated for the State, to the Department of Expenditure, Ministry of Finance, for approval. Based on the recommendation, DoE grants its approval to the project and disburses the funds to the respective States.

State governments have embraced this opportunity and have crafted designs along with comprehensive DPRs for the Unity Malls to showcase their distinctive products and the rich cultural diversity that defines our nation. In addition to the commercial spaces designated for product display and sales, they have conceived Unity Malls as bustling hubs of activities and social gatherings.

As of the composition of this article, DPRs for the construction of Unity Malls have been received from 9 States. Among these, the Ministry of Finance has approved, based on DPIIT's recommendations, for the construction of Unity Malls in 8 States: Assam, Chhattisgarh, Gujarat, Madhya Pradesh, Maharashtra, Meghalaya, Nagaland, and Tripura. The proposal from Sikkim is currently under examination at DPIIT. Detailed insights into the estimated costs of each mall, the allocated amounts for each State, and the amounts approved by the Ministry of Finance are presented in Table-2.

Key features of approved Unity Malls

The Unity Mall in **Assam** is planned in the State capital, Guwahati, and spans an expansive 18,259 square metres of land. In addition to its commercial areas, the mall will feature a library, an art gallery, a museum dedicated to ethnic products, diverse food courts showcasing cuisines from across India, an amphitheatre, a children's play area, a conference hall, a yoga and meditation space, cycling tracks, and jogging areas. Furthermore, every shopkeeper will be attired in State-specific attire, adding to the mall's cultural charm.

Chhattisgarh's Unity Mall is strategically located in Devendra Nagar, Raipur, spanning across 4 acres of land. In keeping with Chhattisgarh's moniker as "*Dhan Ka Katora*" (the bowl of rice), the mall has been artistically crafted in an oval shape,

Entrance to the proposed Unity Mall in Nagaland

Proposed Unity Mall in Guwahati, Assam

resembling a rice seed, symbolising the State's agricultural abundance. Inside the mall, local culture and traditions will come to life through interactive screens, offering visitors an immersive experience. Beyond its shops, this mall boasts a wide array of amenities, including an open-air theatre, serene water bodies, a picturesque terrace garden, a centre for handicraft training and workshops, a modern auditorium, an expansive exhibition area, facilities for local sports activities, and a diverse food court.

In **Nagaland**, a plot of land measuring 3.34 acres has been set aside at Chumukedima, near Dimapur airport, for the construction of the Unity Mall. The mall will feature a range of attractions, including theme restaurants, conference rooms, office spaces, auditoriums, an amphitheatre, a gaming zone, and a vibrant food court. Visitors can also look forward to a rich cultural experience with scheduled music and dance performances, captivating exhibitions, documentary screenings, and engaging masterclasses conducted by skilled artisans.

In **Madhya Pradesh**, elaborate plans have been made for a Unity Mall spanning 2.25 lakh square metres in Ujjain, featuring an iconic Mahakal-Lok elevation. Ujjain, renowned for the *Mahakaleshwar Jyotirlinga*, holds a prominent position as a tourism hotspot. The mall's architectural design encompasses various distinct zones, each with a specific purpose: Millet Lok— reserved for food courts and restaurants; Ekam Lok— designed for cultural activities, conferences, and exhibitions;

Table 2: Estimated Cost, Amount Allocated, and Amount Approved for Unity Malls in Different States

(Rs. in crores)

S.No.	State	Estimated Cost	Financial Support by Government of India	
			Amount allocated	Amount Approved
1.	Assam	226.99	226.00	226.00
2.	Chhattisgarh	200.77	202.00	200.77
3.	Gujarat	339.30	202.00	202.00
4.	Madhya Pradesh	285.67	284.00	284.00
5.	Maharashtra	227.08	215.00	
6.	Meghalaya	431.18	132.00	132.00
7.	Nagaland	145.75	145.00	145.00
8.	Sikkim	110.56	106.00	Proposal under examination
9.	Tripura	140.00	114.00	114.00
Total		**2106.25**	**1626.00**	**1303.77**

Aerial View of the proposed Unity Mall in Meghalaya

Proposed Unity Mall in Navi Mumbai, Maharashtra

Utsav Lok— providing space for open workshops, performances, and digital video walls; Nakshatra Garden— creating a harmonious connection with nature; Kshipra Darshan Deergha— promoting tourism and religious experiences; Takniki Lok— focused on promoting ODOP and GI projects. At the pinnacle of the mall, there are plans for two spacious multiplexes on the top floor.

In **Meghalaya**, the Unity Mall will occupy a vast expanse of 17 acres in New Shillong, the emerging administrative township located on the outskirts of Shillong city. This mall serves as a cultural hub, not only highlighting the rich heritage of Meghalaya but also embracing the cultural tapestry of various other States across the nation.

The Unity Mall in **Gujarat** will be in Kevadia, famous for the Statue of Unity, the tallest statue in the world. The design is centred around an '*Ashoka Chakra*' shape, with the iconic '*Ashoka Stambha*' positioned at its centre. To enhance its visual appeal, the mall intends to employ projection mapping on the building façade. Inside the mall, the interiors are meticulously crafted to capture the essence of '*Haveli*' architecture, reminiscent of the old and historic cities in Gujarat.

The Government of **Tripura** has unveiled plans for the Unity Mall in the capital city of Agartala, set

Aerial View of the proposed Unity Mall in Tripura

to occupy a generous 4.18 acres of land. The mall's prominent features include grand architecture, a dynamic unity plaza, captivating galleries, an interactive hub, and a diverse array of food kiosks. Notably, the mall's roof will be adorned with the colours of the National Flag, adding a patriotic touch to its design. The mall holds significant commercial appeal, as evidenced by the interest of neighbouring Bangladesh in displaying its products within the mall.

In **Maharashtra**, the Unity Mall is slated for construction on a 5,200-square-meter plot of land in Navi Mumbai, strategically located near the allotted area for *Tirumala Tirupati Devasthanam* (TTD). This mall is designed to encompass a rich array of amenities, including an art gallery, a spacious exhibition area, spaces for holding skill development workshops for students and visitors, ample space for a digital and conventional library, theme restaurants, a children's play area, multipurpose halls, mini theatres, an amphitheatre, and interactive spaces.

The initiative to establish Unity Malls throughout the nation draws inspiration from the successful 'Ekta Mall' in Kevadia, Gujarat. In a remarkably short timeframe, several states have secured approvals and financial support for the construction of Unity Malls. Proposals and Detailed Project Reports (DPRs) for Unity Malls in other states are also being rapidly developed. In this transformative era, the nation is on the cusp of witnessing the creation of iconic Unity Malls in every state during the 'Amrit Kaal'. This unique initiative of the Government of India is poised to play pivotal roles in fostering economic development, providing citizens with recreational spaces, enhancing tourism, and celebrating the rich cultural heritage of our diverse and unique nation distinctively. ❑

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AGRI INFRASTRUCTURE

Attaining self-sufficiency in foodgrain production has been one of the greatest achievements of Indian agriculture since Independence. India has graduated from a food-deficit, foodgrain-importing country in 1950s & 1960s to a surplus-generating and leading exporting country, particularly in case of rice and wheat. This transformation was possible through 'Green Revolution', with the adoption of high-yielding varieties and other inputs and favourable government policies, such as Minimum Support Prices and procurement. Today, India is one of the largest producers of many agricultural commodities in the world, such as cereals, fruits, vegetables, spices, sugarcane and cotton.

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The Covid-19 pandemic during 2020-2021 brought challenges to food security for millions of people world-wide due to supply-chain disruptions and affordability. However, the Government of India had taken necessary measures to protect the vulnerable section of the people of India from the food insecurity concern.

Under the Pradhan Mantri Garib Kalyan Ann Yojana (PMGKAY), the Government of India doubled the food entitlement from 5 kg per person per month to 10 kg per person per month to 80 crore people who are covered under the National Food Security Act (NFSA) - from April 2020 to December 2022. Nearly 104.3 million metric tonnes of food grains were distributed from the central food stock in

addition to the regular NFSA during the mentioned period. India also exported 19.83 million metric tonnes of rice per year on average during the 2020-21 to 2022-23 period. This shows India's capacity today not only to meet the food requirements of its own population but also to contribute substantially to world food security.

This was not the situation in the 1950s and 1960s. Food shortages and deficits were then a great concern, which impacted the food security of India. India met its deficit through regular imports, mainly of wheat. With a continuous drought for three years, from 1964 to 1966, the import of wheat reached its highest level of 7.78 million metric tonnes in 1966. The imported quantity was to the extent of 75% of the domestic wheat production of 10.32 million metric tonnes in 1965-66. This also included wheat imported under PL480 from the United States of America. This was even popularly called a 'ship-to-mouth' situation. At this juncture, India started 'Green Revolution', through the introduction of high-yielding varieties of wheat and rice. With favourable government policies and enabling agricultural research to release new varieties, the farmers responded well in such a short period that wheat production more than doubled to 26.41 million metrictonnes in 1971-72 and rice production went up to 43.07 million metric tonnes from 30.59 million metrictonnes in 1965-66. With this increased production of cereals, India's import of wheat started declining, and it approached its floor from the mid-1980s onwards, except for a few years. Actually, India started exporting rice, particularly from the year 2000 onwards, and became the top exporter in recent years, enjoying around a 40% share of global rice exports. This surplus food production is Independent India's great achievement.

Trends in Agricultural Production

The overall food grain production (cereals plus pulses) rose from 51 MT in 1950-51 to over 330 MT in 2022-23. Since 1950-51, the production of food grains has increased over by 6.5 times and that of fruits and vegetables by 12 times, thus making a visible and salutary impact on national food and nutritional security.

Among cereals, the production of rice and wheat, in particular, increased manifold between 1950-51 and 2022-23. Irrigation and power infrastructure had substantially improved over the period, enabled the timely supply of much-needed

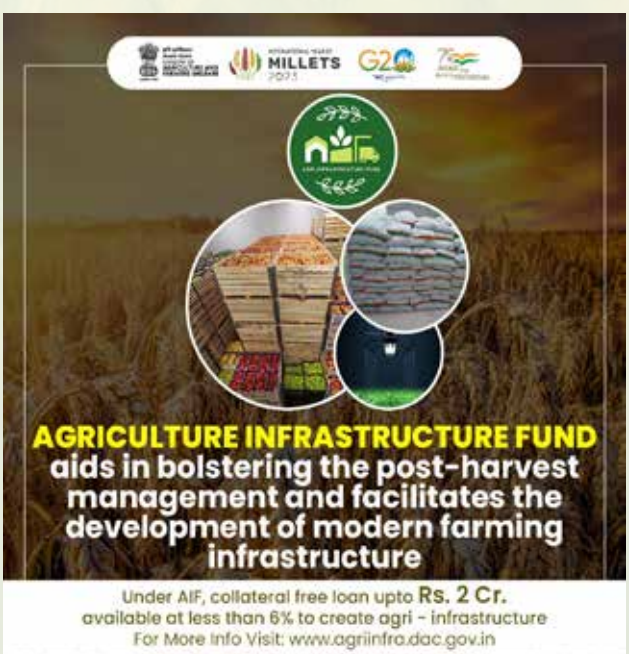
Table 1. Area and production of major crops during 1950-51 and 2022-23

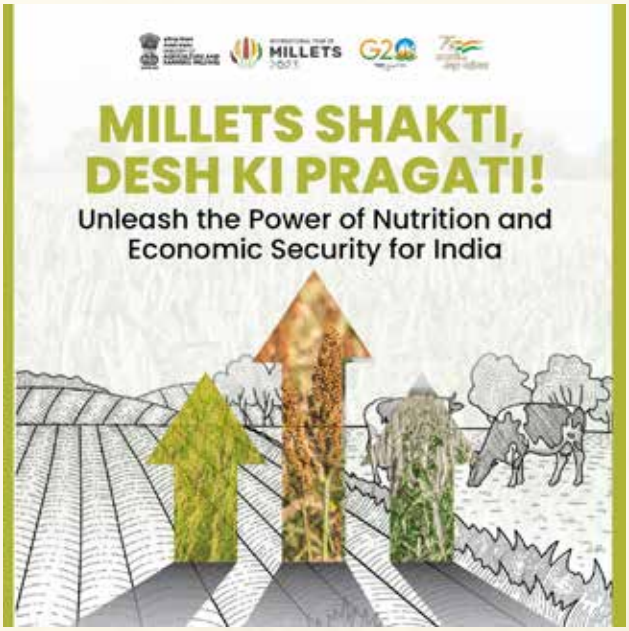
	Area (million hectares)			Production (million tonnes)		
	1950-51	**2022-23***	**Times increase**	**1950-51**	**2022-23***	**Times increase**
Foodgrains	97.32	132.2	1.36	50.82	330.53	6.50
Cereals	77.42	103.07	1.33	42.41	303	7.14
Rice	30.81	47.66	1.55	20.58	135.54	6.59
Wheat	9.75	31.82	3.26	6.46	112.74	17.45
Coarse cereals/Millets	37.67	23.58	0.63	15.38	55.95	3.64
Pulses	19.09	29.13	1.53	8.41	27.5	3.27
Oilseeds	10.73	30.09	2.80	5.16	40.99	7.94

*Note: * 3rd Advance Estimates*

moisture to crops. This reduced crop failure due to the vagaries of the monsoon as compared to the 1950s and 1960s. Further, it facilitated intensive cultivation and the application of modern inputs such as high-yielding varieties, fertilisers, and pesticides. There was enhanced price stability due to Minimum Support Prices and large procurements by government agencies. Coarse cereals and millets production increased to 55 MT in 2022-23, as compared to 15.38 MT in 1950-51. Pearl millet (Bajra) and Sorghum (Jowar) were the two major millets grown in the 1950s. However, the area of cultivation under these crops declined over the same period on account of reduced demand due to a shift in consumers'preferences towards rice and wheat, low yields, and lower profitability. At present, half of the coarse cereal production consists of maize, whose production has increased, thanks to high demand from the poultry industry. Realising environmental and health benefits of millets, the Government of India has given new impetus to millet cultivation. On India's proposal, the United Nations has declared the year 2023 the 'International Year of Millets'.

Pulses are an important source of protein for the Indian population, particularly vegetarians. India is the largest producer and consumer of pulses. Among the many types of pulses grown in India, the major ones are chickpeas (chana), redgram (arhar), green gram (moong), black gram (urad), and lentil (masur). The overall pulse production has gone up from 8.4 MT in 1950-51 to 27 Mt in 2022-23. Chana





has been the major source of growth in the recent past, and it comprises nearly 50% of the total amount of pulses produced. As pulses production has not increased in step with the population growth, per capita availability has declined from 22.1 kg per person in 1951 to 16.4 kg per person in 2022. Though there is surplus production of chana, the imperfect substitution among pulses and limited international availability to bridge the demand gap through imports put pressure on the prices of some pulses. To attain self-sufficiency, the Government of India continues to adopt various measures to incentivise pulses production under National Food Security Mission, Minimum Support Price programmes, and by increasing procurement.

India is dependent on edible oil imports to meet its domestic demand. The import dependency in FY 2022-23 was around 55% of the total requirement. There was near self-sufficiency in the initial years of the 1970s and import dependence was just 3%. However, this figure had gone up to over 30% from the mid-1970s to 1987-88 due to a shortfall in domestic production. The Government of India implemented the Technology Mission on Oilseeds in 1986 to increase domestic production. As a result, the dependence had declined to just 2% in 1993-94. However, the WTO agreement in 1995 put the edible oils under the Open General Licence, which led to a jump in cheap imports. Though duty was imposed to protect domestic production from cheap imports, it was frequently kept at a low level during years

witnessing high international prices, particularly during 2007-2013 and from 2020 onwards. Though it had helped to protect consumers from high prices, prolonged cheap imports reduced domestic oilseed prices below MSP and lessened incentives for farmers to grow oilseeds. Sunflower has gone almost out of domestic production, compared to cultivation on 21 lakh hectares in 1992-93. Similarly, the area under groundnut cultivation declined from 87 lakh hectares in 1991-92 to 50 lakh hectares in 2022-23. The area under cultivation of rapeseed and mustard has remained high due to strong domestic preferences, and soyabean production has increased mainly owing to demand for oil meal. To make the country Atmanirbhar in edible oils, domestic oilseed production is being promoted under the scheme National Food Security Mission-Oilseeds(NFSM-OS) from 2018-19. Further, the National Mission on Edible Oil—Oil Palm (NMEO-OP) has been launched in 2021-22 to promote oil palm cultivation (with a special focus on the North Eastern States and Andaman & Nicobar Islands), with a target of increasing the area under palm oil cultivation from 3.70 lakh hectares in 2021-22 to 10.00 lakh hectares in 2025-26.

Production of fruits and vegetables has increased manifold in the recent decades - from 87 million tonnes in 1991-92 to 320 million tonnes in 2022-23 (First Advance estimate). The yield is also very high - at 17 tonnes/ha, compared to that of food grains (at 2.5 tonnes/ha). There is a major shift towards consumption of fruits and vegetables due to rising per capita income. Therefore, production of fruits and vegetables has a high potential to grow. However, perishability, seasonality, and price volatility pose challenges. Therefore, there is a need for enabling infrastructure, such as processing centres and cold chains, to reduce wastage and maintain regular supply at a reasonable price. The National Agriculture Infra Financing Facility of Rs 1 lakh crore, announced in the year 2020, is a welcome initiative to address the agricultural infrastructure issues holistically.

India is a leading producer of cotton and sugarcane. Adoption of Bt cotton in 2000s enabled significant increase in cotton production - from 100 lakh bales in 2001-02 to 343 lakh bales in 2022-23 (Third Advance estimate). However, development of resistance in pests such as Pink Boll Worm, to Bt cotton, has posed a challenge to the sustenance of cotton production. There is a requirement of evolving technologies to tackle the emerging challenges in cotton cultivation. India is the second largest producer of sugarcane and the largest consumer of sugar in the world. The production has steadily increased over the decades. Sugarcane production fluctuates mainly because of deficit monsoon and because mills, not being able to generate sufficient revenue owing to depressed prices, defer payment to farmers. The Government's ethanol-blending programme and recent initiative of direct conversion of sugar juice to ethanol may ensure adequate price recovery and timely payment to farmers. As a water-intensive crop, its cultivation in semi-arid regions, particularly in Maharashtra, Karnataka and Tamil Nadu, leads to groundwater depletions. Further, lack of mechanisation, particularly for harvesting, is another challenge. The Government's promotion of custom hiring centres for agricultural machinery may benefit adoption of mechanisation.

Agricultural resources and Inputs

The net area sown for crops in 2019-20 was 139.90 million hectares compared to 118.75 million hectares in 1950-51, thus growing by just 1.17 times. However, population growth was 3.8 times higher in the same period. The challenge of meeting the rising demand for food of the rapidly growing population with a limited increase in net area sown was possible through more intensive cultivation and a higher yield. Cultivation of High-Yielding Varieties (HYV)

Table 2. Irrigation and Fertiliser trend

	1950-51	2019-20	Increase by times
Net sown area (Million hectares)	118.75	139.90	1.17
% of net irrigated area	17.55	53.39	3.04
gross area sown (Million hectares)	131.89	211.36	1.6
Fertiliser consumption (Million tonnes)	0.698	29.796	42.68
per ha fertiliser in kg	0.53	140.97	265.98

with more area under irrigation and the application of more inputs such as fertilisers and pesticides played a great role in enhancing agricultural production.

Since 1950, the Indian Council of Agricultural Research has released more than 6000 varieties of crops. Application of fertilisers (Nitrogenous, Phosphatic, and Potassic, or NPK) has increased from 0.5 kg per ha in 1950-51 to 140 kg per ha in 2019-20, while net irrigated area, as a percentage of net sown area, has gone up from 17.55 to 53.39 in the same period (ref table 2).

Fertiliser subsidies by the Government of India have incentivised farmers to apply larger amounts of fertilisers. The recommended ratio of fertiliser application (N:P:K) is 3:2:1. However, farmers apply more nitrogenous fertilisers than the ratio warrants. One of the reasons may be that nitrogenous fertilisers are highly subsidised. To incentivise farmers to go for application of fertilisers more in keeping with recommended proportions, a nutrient-based subsidy scheme was introduced in 2010 and further revised in May 2023. Neem-coated urea was introduced to reduce wastage and diversion of the subsidised product to non-agricultural sectors. Further, the Soil Health Card will help farmers apply the required quantity of fertilisers. The Government is also encouraging farmers to use nano urea for a more sustainable and judicious application of fertilisers.

A vast irrigation potential has been created since Independence. Programmes such as the Command Area Development Programme (started in 1974-75) and the Accelerated Irrigation Benefit Programme (1997) have played a great role in providing water to the parched fields of India. As a result, the net irrigated area reached 53% in 2019-20 from 17.55% in 1950-51. As per the 2010 census, groundwater irrigation has a share of 63% in total irrigation in terms of area. However, groundwater provided water security for agricultural growth where canal irrigation was not possible; overexploitation has an adverse impact on sustainability, particularly in the case of water-intensive crops like paddy and sugarcane in Punjab, Haryana, Karnataka, Maharashtra, and Tamil Nadu. To promote more sustainable and judicious use of water for irrigation, the Government of India is implementing a drip and sprinkler irrigation programme called 'More Crop Per Drop' under the Pradhan Mantri Krishi Sinchayee Yojana from 2015-16. Further, crop diversification is also being promoted.

Price policy and Market

The Government of India fixes Minimum Support Prices (MSP) for 23 commodities in accordance with the recommendations of the Commission for Agricultural Costs and Prices (which came into existence in January 1965) each year, before the sowing season. Assurance of a remunerative and stable price environment is considered very important for increasing agricultural production and productivity since prices often fluctuate in the market. The food grain procurement at MSP, particularly

rice and wheat has provided protection to farmers against price volatility. Pulses and Oilseeds are also being procured at MSP under the Price Support Scheme. To provide more flexibility, Price-Deficient Payment method is also being implemented.

Under the Agricultural Produce Market Committee Act, in most of the States, the agricultural markets have long been regulated, and traders are allowed to buy from the farmers at the market yard. With the availability of IT technology, the National Agricultural Market (e-NAM) was launched on 14 April 2016. e-NAM is a digital platform integrating 1260 APMC mandis across 22 States and 3 UTs to facilitate online trading of 203 agricultural and horticultural commodities to enable farmers to realise more remunerative prices for their produce. e-NAM is catalysing the digital transformation of mandi operations and the e- trading of agricultural commodities.

Digital Public Infrastructure (i.e., Agristack and Krishi Decision Support System) is being built by using space technology and other modern technologies, such as Artificial Intelligence and Machine Learning, to provide inclusive and farmer-centric solutions. This will help farmers and other stakeholders in the areas of crop planning and health, improved access to farm inputs, credit and insurance, crop estimation, market intelligence, and support for the growth of Agri-Tech industry and startups.

As agriculture is highly dependent on weather, there are challenges to sustain food production and make agriculture more resilient to climate change, particularly in rainfed areas. Anticipating the challenges, the Government has been implementing schemes such as the National Mission for Sustainable Agriculture (NMSA) and National Innovations in Climate Resilient Agriculture (NICRA) to cope with biotic and abiotic stress.

Decades of backbreaking work by farmers have transformed Indian agriculture since Independence from a traditional low-production food-deficit sector to a modern surplus food-producing sector. However, domestic production of certain commodities such as pulses and oilseeds cannot meet the growing demand and, as a result, there have been significant imports to meet the shortfall.

The success of Indian agriculture has also invited new challenges. Over-reliance on groundwater irrigation for water intensive crops has depleted groundwater resources in certain regions. As Indian agriculture is still highly dependent on monsoon, climate change may pose many challenges for sustaining future agricultural production. Therefore, India needs to adopt technological solutions, including digital technology, to sustain farm production and overcome the challenges it faces. India needs to brace itself for the challenges ahead, particularly sustaining the level of production in the traditional areas and adapting to climate change. With the application of technology that is more advanced and favourable government policy, the agricultural sector bids fair to surge ahead, vastly strengthened, modern, and more resilient to the vagaries of nature. ❑

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YE-2463/2023

G20
GLOBAL STARTUP ECOSYSTEM

Startups have emerged as drivers of economic revival, restructuring, and expansion, which are fuelled by creativity. They aim to establish a future that is decentralised yet collective, tailored to each nation's specific needs and evolving values. Startup20 is the newest Engagement Group initiated under the Indian G20 Presidency. It aims to harmonise the global startup ecosystem and collaborate across diverse sectors of work.

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The year 2023 marked a significant milestone in the history of global governance as India assumed the presidency of the G20 forum. The Group of Twenty, or G20, is a group of 19 countries and the European Union that represents almost two-thirds of the global population, 75% of global trade, and 85% of the world's GDP. As the largest democracy and one of the fastest-growing economies, India's G20 presidency is a momentous occasion, not just for the nation but for the entire world. This presidency is not just a testament to India's growing economic prowess but also a reflection of its constitutional values, governance mechanisms, and commitment to reforms.

The G20 was established in 1999 in response to the financial crises of the late 1990s, to promote international financial stability. The G20's constitution is not a formal document but a set of principles and practices that guide its functioning. These principles include open and transparent decision-making, consensus-based decision-making, and respect for the sovereignty of its member countries. The governance of the G20 is based on the principle of rotating presidencies, with each member country assuming the presidency for a year. The presidency sets the agenda for the year, hosts the annual G20 Summit, and coordinates the work of the G20 throughout the year. The presidency rotates among the member countries, to ensure representation and inclusivity.

India's G20 Presidency

India's G20 presidency is themed on 'वसुधैव कुटुम्बकम' or 'One Earth · One Family · One Future', a phrase derived from the ancient Sanskrit scripture. The theme of the G20 India presidency underscores the interconnectedness of all life forms and their interdependence on Earth and across the universe. This theme reflects the constitutional values of unity, fraternity, and harmony that are enshrined in the Preamble to the Indian Constitution. It also highlights the LiFE (Lifestyle for Environment) initiative, emphasising the importance of environmentally sustainable and responsible lifestyle choices at both individual and national levels.

The Indian presidency also made significant strides in accelerating progress on the Sustainable Development Goals (SDGs). The G20 countries reaffirmed their commitment to achieving the targets set out in the 2030 Agenda for Sustainable Development, with a particular focus on addressing the impact of the Covid-19 pandemic. In the realm of technology and digital infrastructure, India promoted a human-centric approach to technology and increased knowledge sharing in areas such as digital public infrastructure, financial inclusion, and tech-enabled development in sectors such as agriculture and education.

Governance Mechanism and Working Groups

India holds the G20 presidency for the year 2023, starting from 1 December 2022 and ending on 30 November 2023.To ensure the annual presidency, a rotating chair of three-member 'troika' of the past, current, and next year's chairs is formed. With this, each member country creates a temporary secretariat for the duration of its G20 Presidency; this secretariat coordinates the work and organises the various meetings of the G20. The current troika is formed by Indonesia – India – Brazil. After the completion of the Indian Presidency, the G20 baton goes to Brazil, forming a new Troika of India – Brazil – South Africa.

To take forward the presidency, a series of over 200 events were held across India, leading up to "The Leaders' Summit" in September 2023. These events were designed to strengthen India's agenda and the six thematic priorities of its G20 presidency: Green Development, Climate Finance & LiFE; Accelerated, Inclusive & Resilient Growth; Accelerating Progress on SDGs; Technological Transformation and Digital Public Infrastructure; Multilateral Institutions for the 21st century; and Women Empowerment.

The outcomes of India's G20 presidency are manifold and have a profound impact on the global ecosystem. The focus on green development and climate finance led to significant discussions and commitments towards environmentally sustainable practices. India's emphasis on inclusive and resilient growth led to a renewed focus on supporting small and medium-sized enterprises in global trade, promoting labour rights and welfare, addressing the global skills gap, and building inclusive agricultural value chains and food systems. These initiatives aim to foster economic growth that is not only robust but also equitable and sustainable.

India's G20 presidency also saw efforts to reform multilateralism and create a more accountable, inclusive, and representative international system that is fit for addressing 21st-century challenges. This was a significant step towards creating a global governance system that is more responsive and adaptable to the needs and aspirations of all countries, particularly those from the Global South.

This presidency is not just a testament to India's growing economic influence but also a reflection of its commitment to global cooperation and sustainable development. The meetings held during India's G20 presidency are characterised by open, consensus-based decision-making and respect for the sovereignty of its member countries. These meetings brought together leaders from the G20 countries as well as representatives from international organisations, civil society, and the business community.

The Finance Track, for instance, focused on issues related to global economic growth, international financial architecture, financial regulation, and international tax matters. The Sherpa Track, on the other hand, under focused Working Groups played a crucial role in advancing its agenda in key areas such as finance, trade and investment, agriculture, anti-corruption, development, the digital economy, education, employment, energy, environment, health, tourism, and women empowerment.

The G20 at the leaders' level is a global steering committee. This committee under each presidency is responsible for bringing together the G20 agenda through consultations within the members and the invitee countries. These consultations are the collaborative efforts of the participating countries and their representing delegates. The impetus for these consultations is given by the engagement groups formed in the G20 universe. Currently, the official engagement groups are– Business20, Civil20, Labour20, Parliament20, Science20, Startup20, Think20, Urban20, SAI20, Women20, and Youth20. Business20 is the oldest engagement group and Startup20 is the newest.

The theme of the G20 India presidency underscores the interconnectedness of all life forms and their interdependence on Earth and across the universe. This theme reflects the constitutional values of unity, fraternity, and harmony that are enshrined in the Preamble to the Indian Constitution.

Startup20 Engagement Group

Startup20 is the newest Engagement Group initiated under the Indian G20 Presidency. It aims to harmonise the global startup ecosystem and collaborate across diverse sectors of work like education, finance, energy, sustainability, agriculture, and others. The deliberations of Startup20 have been organised under five taskforces, namely Foundation, Alliance, Finance, Inclusion, and Sustainability. Each taskforce is headed by a Chair and Co-chairs, who are responsible for leading the discussions and bringing the group to a consensus. The Chair and Co-chairs are representatives of the G20 countries who have worked throughout the presidency to bring out

the right requirements and solutions for the global startup ecosystem.

The recommendations and policy directives discussed by the Startup20 group during their tenure are produced under an official communique that focuses on the development and growth agenda of the innovation ecosystems of the G20 member countries and emerging economies.

India has emerged as the world's third-largest startup ecosystem, with 108 unicorns (startups valued at $1 billion or more) and over 98,000 recognised startups. By initiating Startup20 during its G20 Presidency, India seeks to position itself as a 'Global hub for Startups'.

The Working

Startups have emerged as drivers of economic revival, restructuring, and expansion, which are fuelled by creativity. They aim to establish a future that is decentralised yet collective, tailored to each nation's specific needs and evolving values. The global startup industry, currently valued at around $3 trillion in a $90 trillion world economy, is experiencing rapid growth and disruption. Startups are increasingly providing platforms and technologies that enable cross-border collaboration and innovation, aiding economies in accomplishing the Sustainable Development Goals. Consequently, startups play a crucial role in generating employment, fostering technological advancement, promoting long-term growth, and effectively addressing global crises.

India has emerged as the world's third-largest startup ecosystem. By initiating Startup20 during its G20 Presidency, India seeks to position itself as a 'Global hub for Startups'. The five Task Forces of Startup20 worked in tandem to arrive at a consensus in the form of a Policy Communique that captures the new dawn of innovation and technology and its impact on the Global Startup Ecosystem:

- **Foundations:** The policy directives put forth by Foundation Taskforce focus on creating and adopting consensus-based definitions and terminology to strengthen the startup ecosystems within and across G20 nations. Further, the definitions and terminologies will be evaluated to prepare a handbook for startups to strengthen the Startup20 foundation.
- **Alliances:** Alliances are critical for scaling up businesses in domestic as well as international markets. The recommendations and policy directives under this taskforce offer a way to address challenges confronting startups in expanding to international markets, navigating regulatory requirements, accessing mentor networks, finding entrepreneurial talent, and working with larger corporations and governments. This task force emphasised creating a framework for building global partnerships and fostering cross-country collaboration among stakeholders in the startup ecosystem in the G20 economies.
- **Finance:** The finance task force will focus on policies and frameworks to facilitate a favourable policy environment for startup financing; create a supportive environment by providing networking and launch opportunities; and enable measures to ease the cross-border flow of capital across the G20 Nations. India, under the Startup20 Policy Communique has urged the G20 Nations to 'Raise the joint annual investment of G20 nations in the global startup ecosystem to US$ 1 trillion by 2030.'
- **Inclusiveness:** The recommendations and policy directives under the Inclusion taskforce offer a way to foster a culture of inclusivity and diversity in the global startup ecosystem and support those startups that prioritise inclusion.
- **Sustainability:** This taskforce will work towards establishing mechanisms to accelerate startups that address significant SDG gaps in areas of common interest to all other countries or represent groups whose inclusion requires special attention (for example, women entrepreneurs and people with disabilities).

Through the Startup20 Engagement Group, India aims to help the world develop an action-oriented, decisive, and inclusive framework that supports innovative startups through strategic

cooperation in G20 countries. While each of the G20 countries builds its startup ecosystem in-house, the grouping will work together to enable startup financing models and provide co-creation, especially for globally significant sectors.

Consensus and Communiqué

The final step in the journey of the G20 is 'The Communiqué'. A communiqué is an official statement document that is produced as an end-product of each G20 summit (both main meetings and engagement groups). Declarations, communiqués, action plans, and other major collective documents express the consensus of the G20 nations. These documents about summits are the result of careful preparation by teams and tracks (Sherpa, working, and engagement groups), who regularly consult with their leaders, counterparts from other G20 members, and other major stakeholders during the year-long process leading to the summit. Like other groups under the G20, Startup20 also produced an official policy communiqué after getting consensus from participating G20 nations. The agreed-upon policy communiqué will then become part of the final official policy document produced under the G20 presidency of India.

To move in the direction of a consensus policy communique, the Startup20 Engagement Group during its tenure has held four deliberations. With this, Startup20 held various virtual and physical public consultations as Startup20 Sabha, where the startup ecosystem stakeholders of G20 countries discussed and gave feedback on the Policy Communique. The group culminated in its summit meeting.

The Inception Meeting in Hyderabad served as a precursor to establishing the agenda for the Startup20 Engagement Group during the Presidency. Over 200 participants from 24 countries (including G20 and invitee countries) participated in the conference. The primary focus of the meeting was to introduce the task forces and their objectives to a larger audience. The representatives shared their feedback during the discussions. The Sikkim Sabha, which was an extension of the Inception Meeting, saw the participation of sixteen G20 countries. During this meeting, the discussions centered around the task forces, where delegates discussed and deliberated on policy objectives, recommendations, actions, and outcomes. These discussions were held in multiple rounds with diverse representation and documented through a series of feedback sessions to build the final consensus. The final deliberation in Goa focused on bringing about consensus among the G20 nations over the recommendations in the policy communique.

Apart from the policy document, the deliberations of Startup20

also focused on creating a Startup Handbook of common agreed-upon definitions and terminologies about startups ecosystem and a Global Innovation Centre, which will foster collaborations across the borders of G20 Nations. The Startup20 – G20 countries will also work towards promoting Startup20 as a Global Point of Contact for startup ecosystems worldwide and creating a startup financing framework to enable the financing of startups across G20 member nations.

Conclusion

India's G20 presidency seeks to foster consensus among member nations through open and transparent discussions. While the larger Group of Twenty will concentrate on reaching agreements on areas such as social protection, financial inclusion, the digital economy, health and technology, sustainability, and economic growth, the engagement groups will aim to bring these discussions to the public, making it a participatory process under *Jan Bhagidari*.

The Startup20 Engagement Group has come up with five major action points to build the Global Startup Ecosystem with the joint efforts of G20 countries, which are aligned with the five task forces:

- Action 1: Create and adopt a global startup definition framework.
- Action 2: Increase, diversify, and ease access to global capital, markets, mentors, and talent for startups.
- Action 3: Emphasise the inclusion of under-represented groups and communities in startup ecosystems.
- Action 4: Cultivate mechanisms to identify and scale startups of global interest.
- Action 5: Establish a networked institution across G20 nations.

Through this Engagement Group, official policy statements capturing the generally accepted recommendations and action items of the G20 nations are compiled and presented. In addition, as a result of the above interactions, several publications on guidelines, best practices, frameworks, and strategic recommendations will also be received. During this presidency, the Startup20 Engagement Group aimed to:

- Raise the joint annual investment of G20 nations in the global startup ecosystem to US$ 1 trillion by 2030.
- Consider favourably recommendations, policy directives, and actions in five areas for harmonising the global startup ecosystem while retaining the autonomy of the national ecosystems.
- Build a networked institution of existing nodal agencies across G20 nations to implement recommendations.
- Measure the efficacy of Startup20 in enabling G20 nations to identify promising startups internationally, fund them collaboratively, mentor them contextually, and scale them globally.
- Continue this group in future G20 presidencies.

In addition, India also aspires to create a 'Global Innovation Centre' that can carry out such activities and the results of this commitment. India's focus on women's empowerment has led to significant discussions and commitments towards gender equality and the empowerment of women in all spheres of life. This was a crucial step towards achieving gender equality, one of the key SDGs. The impact of India's G20 presidency on the global ecosystem was profound. It not only brought to the fore critical issues such as climate change, sustainable development, and inclusive growth but also demonstrated the potential of emerging economies like India in shaping the global governance agenda.

Though the G20 was established as a crisis management committee for a struggling world economy, the group has managed to become a premier forum that serves economic growth and global stability. Individual tracks and Engagement groups deliberate on their defined objectives and give outcome-based recommendations.

Each presidency stirs up different narratives. The Indian Presidency of the Group of Twenty will encourage conversations of collaboration and consensus focused on actions and decisions. ❑

(Other contributing author is Garima Ujjainia, Young Professional, Atal Innovation Mission)

PM GATISHAKTI NATIONAL MASTER PLAN

To achieve Atmanirbharta and a US $5 trillion economy by 2025, there was a need to create multimodal and last-mile connectivity infrastructure across the country. This would ensure a modal mix of transportation, reduced logistics cost, increased export competitiveness, and a cycle of higher investments, growth, and employment generation in the economy.

Launched in October 2021, PM GatiShakti adopts a 'whole of the government approach' and 'cooperative federalism' to transform India's infrastructural landscape. Through integrated planning and synchronised project implementation across all concerned Ministries and State Governments, PM GatiShakti's objective is to improve multimodal connectivity, and logistics efficiency and address critical infrastructure gaps for the seamless movement of people, goods, and services in the country.

PM GatiShakti fosters a whole of government approach by bringing together 27 Central Government Ministries under a single institutional framework. An Empowered Group of Secretaries (EGoS) under the Chairmanship of the Cabinet Secretary has been constituted to oversee the implementation of PM GatiShakti. It is the apex body with 23 infrastructure and user ministries of the Government of India. An integrated multimodal Network Planning Group (NPG) has been operationalised with representation from 8 various infrastructure Ministries involving heads of their Network Planning Division. NPG examines projects and puts them up to EGoS for approval. Logistics Division, DPIIT is the Secretariat of the NPG and Technical Support Unit with a group of domain/subject matter experts which support the evaluation process. Involving every concerned Central Ministries/Departments within a single institutional structure, 81 High Impact Projects, 54 NPG Projects, and 197 Critical Infrastructure Gaps have been identified and evaluated by the institutional mechanism under PM GatiShakti.

Promoting Cooperative Federalism in Infrastructure Development Under PM GatiShakti, integrated development of infrastructure in the country by the Government with all the State Governments is in consonance with the federal spirit. States and UTs have also replicated a similar institutional structure for integrated planning and synchronised project implementation through the PM GatiShakti mechanism. 36 States and UTs have been using their EGoS, NPG and TSU for project examination, planning, and synchronised implementation.

Catalysing Infrastructure Planning With Technology

The PM GatiShakti NMP is a technology-backed infrastructure development platform with GIS-based data layers of infrastructure, geographic features and demography, and various decision support systems. Developed by BISAG-N, the platform enables integrated planning, synchronised implementation, and project monitoring. The platform aims at enhancing industrial productivity and helping the country achieve its green logistics and clean energy goals by enormously boosting the multi-modal connectivity across highways, railways, ports, airports, logistics infrastructure, mass urban transportation, and inland waterways. ❑

Source: PM GatiShakti

ISSN-0971-8400
Total pages - 64
Published on 23 September, 2023
Posted on 25 & 26 September, 2023

RNI No. 949/57
U(DN)-56/2021-23 licenced to post without
pre-payment at RMS, Delhi.
Postal Registration No. DL(S)-05/3230/2021-23.
Magazine Post No. DL(DS)-40/MP/2022-23-24.

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Ministry of Information and Broadcasting
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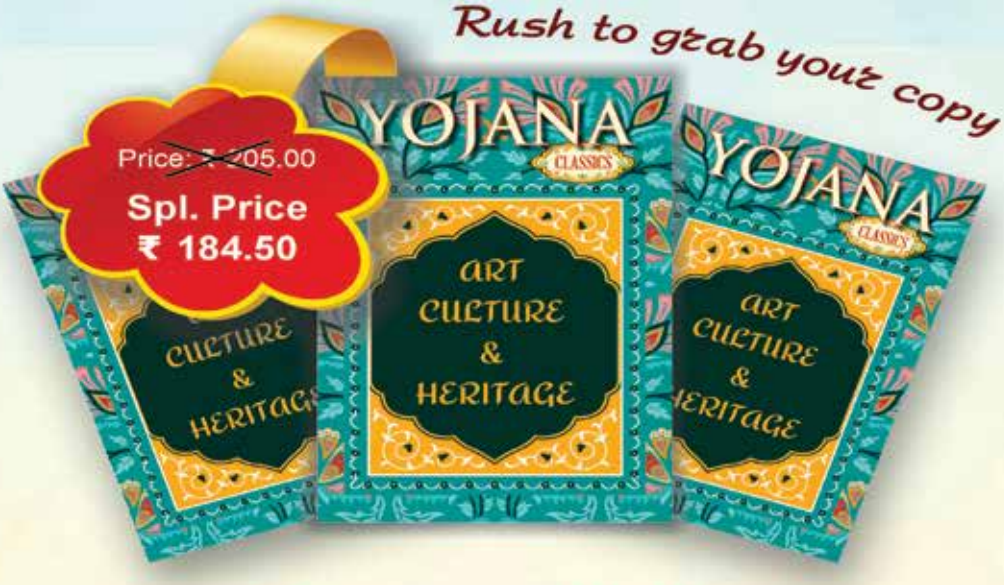

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Printed & Published by Anupama Bhatnagar, Director General, Publications Division, Soochna Bhawan, C.G.O. Complex, Lodhi Road, New Delhi-110003. Printed at Sundeep Press, C-105/2, Naraina Industrial Area, Phase-1, New Delhi. Editor: Shuchita Chaturvedi