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**FEBRUARY 2022**

# PIB

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## GENERAL STUDIES PAPER-II

### 36<sup>th</sup> Foundation Day of APEDA

#### Why in News

- Agricultural Products Export Development Authority (APEDA) celebrated its 36th Foundation Day on 13<sup>th</sup> February, 2022.
- The share of APEDA exports (USD 20.67 billion) constituted 49% of overall agri- product exports in 2020-21 out of which,
  - a. Cereals and fresh horticulture comprised 59%.
  - b. Cereal preparations and miscellaneous processed items 23%.
  - c. Animal products 18%.

#### Background

- Realising the importance of Agriculture and Processed Food Products export from the country, the Government in 1986 had set up APEDA through an Act of Parliament under the Ministry of Commerce and Industry, Government of India.
  - Then the newly created body replaced the then existing Processed Food Export Promotion Council.
  - The APEDA had been undertaking most of the activities as per its mandate and scope of work allocated spanning its 14 product categories which mainly includes the sector of fruits and vegetables, processed fruits and vegetables, animal, dairy and poultry products and cereals.
- APEDA has actively supported the Government in taking the export of agricultural products to USD 20.67 billion in 2020-21 from USD 0.6 billion in 1986 when it was founded. It also helped expand the export basket to 205 countries.
- The target given to APEDA in the current financial year (2021-22) is USD 23.7 billion, out of which more than 70% i.e. USD 17.20 billion has been achieved till January 2022, and the remaining target is expected to be completed within the stipulated time period.

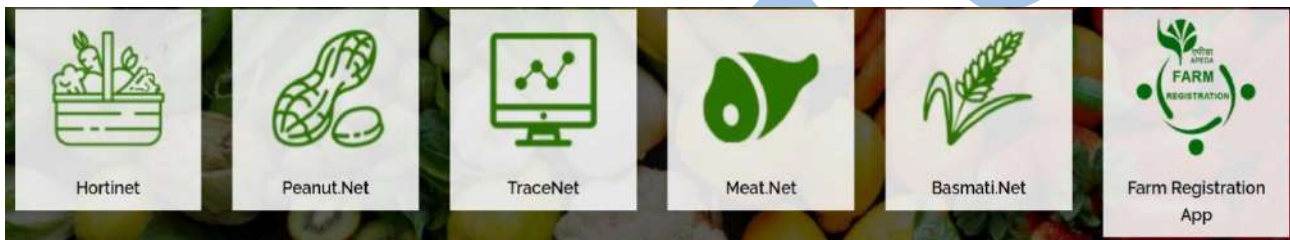
#### Highlights

- a. **IT Enabled Activities:** Aiming to take export of agricultural products to a new level, APEDA promoted IT-enabled activities for ease of doing business in the promotion and development of exports from India.
- APEDA has undertaken initiatives like paperless office (re-engineering, digital signatures, electronic payment facility), APEDA Mobile App, phase-wise delivery of online services, monitoring and evaluation, uniform access, and virtual trade fair to make governance more efficient and effective.



- b. **Export of GI Tagged Products:** Keeping in mind the call for 'vocal for local' and 'Atmanirbhar Bharat', APEDA has been focusing on promotion of exports of locally sourced Geographical Indications (GI) tagged as well as indigenous, ethnic agricultural products.
  - As on date, there are 417 registered GI products and of them around 150 GI tagged products are agricultural and food GI out of which more than 100 registered GI products fall under the category of APEDA scheduled products (Cereals, Fresh Fruits and vegetables, processed products, etc).
  - In 2020-21 and in the current fiscal, some of ethnic and GI tagged products exported by India include dragon fruit, patented village rice, jackfruit, jamun, Burmese grapes, dehydrated mahua flowers, puffed rice.
  - GI varieties of mango, GI tagged Shahi litchi, Bhalia wheat, Madurai malli, Mihidana, Sitabhog, Dahanu Gholvad Sapota, Jalgaon banana, Vazhakulam pineapple and Marayoor jiggery, etc.

- c. The implementation of revamped *Agri Export Policy* is also in the final stage as 21 states and two UTs (Ladakh A&N Islands) have already finalised the state specific action plan.
- Country specific agri-export strategy reports have been prepared for 60 countries in consultation with the Indian Embassies and High Commissions of the respective countries to tap the opportunities emerging during Covid-19 pandemic and the potential for agri exports to countries.
- d. In coordination with the Government of India's thrust on ensuring 'ease of doing business', APEDA is working with the state governments for ensuring traceability and market linkages for farmers for promoting exports.
- APEDA's thrust has been on ensuring digitalization of land records and formalization of tenancy for the farmers, which helps in boosting exports.
  - A *Market Intelligence Cell* has been constituted in APEDA and the activity of dissemination of E-market intelligence reports comprising detailed market analysis has commenced.
  - A *Farmer Connect Portal* has also been set up by APEDA on its website for providing a platform for Farmer Producers Organisations (FPOs) or Farmer Producer Companies (FPCs), Cooperatives to interact with exporters.
- e. **GrapeNet:** For promoting use of hybrid technology, APEDA has integrated a Blockchain solution into its GrapeNet traceability platform.
- The GrapeNet is a web-based certification and traceability software system for monitoring fresh grapes exported from India to the European Union.
  - The Blockchain solution, called APEDA Trust Chain, helps track all the details of the export consignment, right down to the location of the vineyards.



- f. Working in collaboration with the Ministry of Commerce & Industry, the APEDA has taken a giant leap in making landlocked Purvanchal a new destination of agri export activities by developing Varanasi Agri - Export Hub in a record time.
- g. Considering the importance of food safety and traceability required by the importing countries of developed economies, APEDA took a number of initiatives in the area of quality development such as preparation of standards, procedures for identified potential products, development of residue monitoring protocol, recognition of laboratories and implementation of traceability systems, etc.

## Modernisation of Police Forces (MPF)

### Why in News

- The Government has approved continuation of umbrella scheme of Modernisation of Police Forces (MPF).
- The approval for the period 2021-22 to 2025-26, moves forward the initiative to modernise and improve the functioning of Police Forces of States and Union Territories.
- This scheme comprises all relevant sub-schemes that contribute to modernization and improvement with a total Central financial outlay of Rs.26,275 crore.

### Brief Details

- To improve the quality of forensics, policing and weapons, the Centre has approved the continuation of a mega police modernisation scheme for five years (up to 2025-26) with a financial outlay of Rs 26,275 crore.
- The scheme includes security-related expenditure in Jammu and Kashmir, northeastern states and Maoist-affected areas for raising new battalions, developing high-tech forensic laboratories and other investigation tools.

### Salient Features

- Provision has been made under the Scheme for internal security, law and order, adoption of modern technology by Police, assisting States for narcotics control and strengthening the criminal justice system by developing a robust forensic set-up in the country.

- The Scheme for modernization of State police forces has a Central outlay of Rs.4,846 crore.
- To develop operationally independent high-quality forensic sciences facilities in States/Union Territories for aiding scientific and timely investigation through modernization of resources. A central Scheme for the Modernisation of Forensic Capacities with outlay of Rs.2,080.50 crore has been approved.
- Central outlay of Rs.18,839 crore has been earmarked for security related expenditure for the Union Territories of Jammu & Kashmir, insurgency affected North Eastern States and Left Wing Extremism (LWE) affected areas.
- With the implementation of 'National Policy and Action Plan' for combating LWE, the LWE violence incidents have come down drastically. To further pursue this accomplishment, six LWE related schemes with Central outlay of Rs.8,689 crore have been approved. These schemes include Special Central Assistance (SCA) to Most LWE Affected Districts & Districts of Concern to consolidate the gains.
- For raising of India Reserve Battalions/Specialised India Reserve Battalions, Central outlay of Rs.350 crore has been approved.
- Central sector scheme of 'Assistance to States & Union Territories for Narcotics Control with outlay of Rs.50 crore has been continued.

## "SMILE" Scheme

### Why in News

- Union Minister for Social Justice & Empowerment Dr. Virendra Kumar has recently launched the Central Sector Scheme "*SMILE: Support for Marginalized Individuals for Livelihood and Enterprise*" on 12.02.2022.
- This umbrella scheme, under the aegis of the Department of Social Justice & Empowerment, is designed to provide welfare measures to the Transgender community and the people engaged in the act of begging.

### About the Scheme

- The scheme includes two sub-schemes- '*Central Sector Scheme for Comprehensive Rehabilitation for Welfare of Transgender Persons*' and the '*Central Sector Scheme for Comprehensive Rehabilitation of engaged in the act of Begging*'.
- The scheme strengthens and expands the reach of the Rights that give the targeted group the necessary legal protection and a promise to a secured life.
  - It keeps in mind the social security that is needed through multiple dimensions of identity, medical care, education, occupational opportunities, and shelter.
  - The Ministry has allocated Rs. 365 Crore for the scheme from 2021-22 to 2025-26.

### Brief Details

- The Sub-scheme - '*Central Sector Scheme for Comprehensive Rehabilitation for Welfare of Transgender Persons*' includes the following components-
  - a. *Scholarships for Transgender Students*: Scholarships for students studying in IX and till post-graduation to enable them to complete their education.
  - b. *Skill Development and Livelihood*: Skill Development and Livelihood under PM-DAKSH scheme of the Department.
  - c. *Composite Medical Health*: A comprehensive package in convergence with PM-JAY supporting Gender-Reaffirmation surgeries through selected hospitals
  - d. *Housing in the form of 'Garima Greh'*: Shelter Homes 'Garima Greh' where food, clothing, recreational facilities, skill development opportunities, recreational activities, medical support, etc. will be provided.
  - e. *Provision of Transgender Protection Cell*: Setting up of Transgender Protection in each state to monitor cases of offences and to ensure timely registration, investigation, and prosecution of offences.
  - f. *E-Services* (National Portal & Helpline and Advertisement) and other Welfare Measures.
- The focus of the sub-scheme '*Comprehensive Rehabilitation of persons engaged in the act of Begging*' is as follows-
  - a. *Survey and identification*: Survey and Identification of beneficiaries shall be carried out by the Implementing Agencies.
  - b. *Mobilization*: Outreach work will be done to mobilize the persons engaged in begging to avail the services available in the Shelter Homes.
  - c. *Rescue/Shelter Home*: The shelter homes will facilitate education for children engaged in the act of Begging and children of persons engaged in the act of Begging.

d. *Comprehensive resettlement.*

### Implementation and Monitoring

- The sub schemes will be implemented by a party consisting of National Coordinators along with a suitable team which will be created in the Ministry.
- The qualifications of the National Coordinator, emoluments, powers and functions and line of command will be as prescribed by the Department of Social Justice & Empowerment.
- The components will be monitored at regular intervals by the Ministry including Project Monitoring Unit (PMU) or any other agency/unit appointed by the Ministry of Social Justice & Empowerment.

## National Rail Plan (NRP) for India - 2030

### Why in News

- Indian Railways have prepared a National Rail Plan (NRP) for India - 2030. The Plan is to create a 'future ready' Railway system by 2030.

### Aim and Objective

- The NRP is aimed to formulate 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 and also increase the modal share of Railways to 45% in freight traffic and to continue to sustain it.
- To achieve this objective all possible financial models including Public-Private Partnership (PPP) are being considered.

### Focus areas

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

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## Way Forward

- As Indian Railways is the growth engine of the nation, NRP is aimed to reform Railways to make it more efficient, greener, and modern which will translate into cheaper, safer, and assured mode of transport to the common man be it in passenger or freight segment.

## New India Literacy Programme

### Why in news

- The government has recently approved a new scheme "New India Literacy Programme for the period FYs 2022-2027 to cover all the aspects of Adult Education to align with National Education Policy 2020 and Budget Announcements 2021-22.
- The National Education Policy 2020 has recommendations for Adult Education and Lifelong Learning.

### About the Scheme

- The scheme will be implemented through volunteerism through online mode.
- The training, orientation, workshops of volunteers, maybe organized through face-to-face mode.
- All material and resources shall be provided digitally for easy access to registered volunteers through easily accessible digital modes, viz, TV, radio, cell phone-based free/open-source Apps/portals, etc.
- The scheme will cover *non-literates of the age of 15 years and above* in all states/UTs in the country.
- The target for Foundational Literacy and Numeracy for FYs 2022-27 is 5 (five) crore learners @ 1.00 crore per year by using "*Online Teaching, Learning and Assessment System (OTLAS)*" in collaboration with National Informatics Centre, NCERT, and NIOS in which a learner may register him/herself with essential information like name, date of birth, gender, Aadhaar number, mobile number, etc.
- The estimated total outlay of the "New India Literacy Programme" is Rs.1037.90 crore which includes the Central share of Rs.700 crore and State share of Rs.337.90 crore respectively for the FYs 2022 -27.

### Salient features

- The school will be a Unit for implementation of the scheme.
- Schools to be used for conducting a survey of beneficiaries and Voluntary Teachers (VTs).
- Different strategies are to be adopted for different age cohorts. Flexibility for States/UTs will be provided to undertake innovative activities.
- Foundational Literacy and Numeracy will be imparted through Critical Life Skills to all non-literates in the age group of 15 years and above.
- Use of Technologies to impart Adult Education for wider coverage of the scheme.
- Performance Grading Index (PGI) for State/UT and district level will show the performance of States and UTs to implement the scheme and achievements on yearly basis by weighing both the physical and financial progress through UDISE portal.
- CSR/Philanthropic Support may be received by hosting ICT support, providing volunteer support, opening facilitation centres for learners and for providing IT access to economically weak learners in the form of cell phones, etc
- Priority and Saturation in Literacy- The age cohort of 15-35 will be saturated first followed by ages 35 and above.
  - Priority will be given in terms of categories to the Girls and women, SC/ST/OBC/Minorities, Persons with Special Needs (Divyangjans), Marginalized/ Nomadic/ construction workers/ laborers/etc. , who can substantially and immediately benefit from adult education.
  - In terms of location/area, the focus shall be on all aspirational districts of NITI Aayog, districts with literacy rates less than the National/State average, districts with female literacy rates less than 60% as per the 2011 Census, Districts/ Blocks with large SC/ST/ Minority population, Educationally Backward Blocks, Left Wing Extremism Affected districts.
- Convergence with Ministries and Departments for effective implementation of NILP: MeitY: Digital Literacy, DFS/MoF: Financial Literacy, MoSDE: Skilling, DoJ/MoLJ: Legal Literacy, MoD: Involvement of NCC Volunteer and Ex-Servicemen, MoYAS: Involvement of NYKS, NSS, MoRD: NRLM and DDU-GKY, MoC: Involvement of Cooperative Societies, MoHFW: Health and Hygiene Literacy, NDMA/MHA: Disaster Management, MoMA: for implementing among Minorities, DoHE: Continuing Edn, Min of Culture: Libraries, Cultural Literacy, MoPR: For

Panchayat support, Rural Libraries, MWCD: Involvement of Anganwadi Workers, and MoTA: Implementing in Tribal areas etc.

## Inter-Operable Criminal Justice System (ICJS)

### Why in News

- The Government of India has approved the implementation of the Inter-Operable Criminal Justice System (ICJS) project by the Ministry of Home Affairs at a total cost of Rs.3,375 crore during the period from 2022-23 to 2025-26.
  - Under the guidance of the Union Minister of Home Affairs Shri Amit Shah, Phase II of the ICJS project will be a step towards ensuring effective and modern policing.
  - The project will be implemented as a Central Sector Scheme.

### About the Project

- The ICJS system would be made available through a dedicated and secure cloud-based infrastructure with high-speed connectivity.
- National Crime Records Bureau (NCRB) will be responsible for the implementation of the project in association with the National Informatics Center (NIC).
- The project will be implemented in collaboration with the States and Union Territories.

### Background

- Inter-Operable Criminal Justice System (ICJS) is a national platform for enabling integration of the main IT system used for delivery of Criminal Justice in the country by five pillars namely:-
  - a. Police (Crime and Criminal Tracking and Network Systems),
  - b. e-Forensics for Forensic Labs,
  - c. e-Courts for Courts,
  - d. e-Prosecution for Public Prosecutors
  - e. e-Prisons for Prisons.

### Implementation

- a. In Phase-I of the ICJS project, individual IT systems have been implemented and stabilized; also search of records have been enabled on these systems.
- b. Under Phase-II, the system is being built on the principle of 'one data one entry' whereby data is entered only once in one pillar and the same is then available in all other pillars without the need to re-enter the data in each pillar.

## GENERAL STUDIES PAPER III

## Voice of the Customer

### Why in News

- Seven AAI airports namely Chennai, Kolkata, Goa, Pune, Patna, Bhubaneswar & Chandigarh that participated in the ACI-ASQ survey in 2021, have been chosen for *Voice of Customer Recognition* under Airports Council International (ACI) World's Voice of the Customer initiative.

### Background

- Airports Council International has initiated the 'Voice of the Customer' initiative to acknowledge and recognize airports that continued to prioritize their customers and are committed to ensuring their voice was heard, even during the ongoing COVID-19 pandemic.

### About the Survey

- Airport Service Quality (ASQ) survey is the world-renowned and internationally established global benchmarking programme measuring passenger's satisfaction, whilst they travel through an airport, conducted by the Airports Council International (ACI).

- The Airport Service Quality programme is the world's leading airport customer experience measurement and benchmarking programme.
  - The ASQ Departures programme measures passengers' satisfaction across 34 key performance indicators.
  - More than half of the world's travellers pass through an ASQ airport.
- ASQ Awards recognize those airports around the world that deliver the best customer experience in the opinion of their own passengers.
- The ASQ programme provides the research tool and management information to better understand passengers' views and what they want from an airport from the products and services standpoint.

## Machine to Machine communication (M2M) sector

### Why in News

- Government of India has identified that M2M/ Internet of Things (IoT) is one of the fastest emerging technologies across the globe, providing enormous beneficial opportunities for society, industry, and consumers.
  - It is being used to create smart infrastructure in various verticals such as Power, Automotive, Safety & Surveillance, Remote Health Management, Agriculture, Smart Homes, Industry 4.0, Smart Cities, etc. using connected devices.

### Steps Taken

- In order to strengthen the M2M eco-system and to facilitate wider proliferation and innovation in the sector, the following actions have been taken recently :
  - a. *Guidelines for registration of M2MSP Service Providers and WPAN/WLAN Connectivity Providers have been issued.*
    - Applicants need to register themselves to provide SIM and WPAN/WLAN-based M2M Communication.
    - This will help in addressing concerns like connectivity with TSPs, KYC, traceability, and encryption. Registration shall be carried out at field offices of DoT spread across the country.
  - b. *New licenses for UL(M2M) and UL-VNO(M2M) under UL and UL-VNO licenses have been introduced and accordingly the guideline for UL and UL (VNO) were amended.*
  - c. *To have additional availability of spectrum for M2M/IoT applications, 1 (one) MHz additional spectrum is added in the earlier unlicensed 865-867 MHz band, making it 865-868 MHz.*
    - Also radiated power, channel bandwidth and duty cycle have been defined for different use cases.
  - d. *Released 13-digit numbering plan exclusively for M2M/IoT devices connected through mobile networks.*
  - e. *Features of the SIMs used only for M2M Communication Services have been defined and related KYC instructions for issuing M2M SIMs to entity/organization providing M2M Communication under bulk category have also been issued.*
  - f. *TEC had also released recommendations on IoT/ M2M security in Jan. '19 and Code of practice for securing consumer IoT in Aug '21. Both these documents suggest ways to have safe and secure IoT deployments.*

### Conclusion

- Machine to Machine communication is going to play a major role and will contribute significantly towards the government of India initiative of Digital India and Make in India.
- The above regulatory enablement for M2M Services is expected to
  - a. Reduce cost.
  - b. Enhance productivity.
  - c. Provide faster response time.
  - d. Optimize resource consumption.
  - e. Increase revenue for the businesses leading to ease of living for the common citizens.

## Integrated Management of Wetland Biodiversity and Ecosystem Services

### Why in News

#### Background

- The Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India through the National Plan for Conservation of Aquatic Ecosystems (NPCA) seeks to conserve and sustainably manage wetlands across the country and aims to stem their continued loss and degradation by promoting a cross-sectoral policy, planning, and decision-making environment.
- The GEF-funded Integrated Management of Wetland Biodiversity and Ecosystem Services (IMWBES) project complements and builds on the existing policy and practice frameworks in order to improve the management effectiveness of nationally and internationally important wetlands in India and to secure the socio-economic and environmental benefits through wetland wise use.

#### Goals and Objective

- “Conservation and wise use of wetlands for sustained provision of their full range of ecosystem services and maintenance of biodiversity”
- “Enhance management effectiveness of wetlands of national and global significance and integration in developmental planning”.

#### Components

- It consists of 4 components :
  - a. National wetland biodiversity and ecosystem services-based knowledge systems designed to make available knowledge systems that enable wetland managers systematic inclusion of wetland biodiversity and ecosystem services (BES) values.
  - b. National Scale Capacity building for applying integrated wetland management.
  - c. Demonstration of integrated wetland management in three wetlands to facilitate learning and the development of best practices for up-scaling and wider implementation within state governments.
  - d. Project monitoring, evaluation, and outcome dissemination to ensure that the project meets its stipulated objectives, and the results are effectively disseminated to the wetland managers and stakeholders within state government.

#### Funding and Implementation

- The IMWBES project is funded under Global Environment Facility (GEF). The GEF Trust Fund (GEFTF), has sanctioned a budget equivalent to Rs. 31.13 crores over a period of five years.
- The three wetlands included in the project are *Sasthamcotta Lake in Kerala, Harike Lake in Punjab and Kabartal in Bihar*.
  - Out of the GEFTF, a total budget equivalent to Rs. 19.02 crore has been allocated for the said three wetlands, to be given equally to all the three States.

## Multi-Stage Memetic Binary Tree Anomaly Identifier (MSMBTAI)

### Why in News

- Utilising an Artificial Intelligence-based algorithm, Indian Astronomers have devised a new approach for identifying potentially habitable planets with a high probability.
- According to the study, there are 60 potentially habitable planets out of about 5000 confirmed, and nearly 8000 candidate planets proposed.
- The assessment is based on their close similarity to Earth. These planets can be viewed as candidates for anomalous instances in a huge pool of ‘non-habitable’ exoplanets.

#### Background

- Humanity has been looking at the cosmos and believing that other inhabited worlds are out there. Current estimates are that the number of planets in our Galaxy alone run into billions, possibly a number greater than the number of stars itself.

## About the New Approach

- In the present work, astronomers from the Indian Institute of Astrophysics, an autonomous institute of the Department of Science & Technology, Govt. Of India, along with astronomers from BITS Pilani, Goa campus have devised a new approach -- an anomaly detection method -- by which they can identify potentially habitable ones with a high probability.
- *The method is based on the postulate that Earth is an anomaly, with the possibility of the existence of a few other anomalies among thousands of data points. The study is published in the journal, Monthly Notices of the Royal Astronomical Society (MNRAS).*
- The AI-based method, named *Multi-Stage Memetic Binary Tree Anomaly Identifier (MSMBTAI)*, is based on a novel multi-stage memetic algorithm (MSMA).
  - MSMA uses the generic notion of a meme, which is an idea or knowledge that gets transferred from one person to another by imitation.
  - A meme indicates cross-cultural evolution in posterity and, therefore, can induce new learning mechanisms as generations pass.
  - The algorithm can act as a quick screening tool for evaluating habitability perspectives from observed properties.

## Issues

- However, with a large number of discovered exoplanets, finding those rare anomalous instances by characterizing them in terms of planetary parameters, types, populations, and, ultimately, the habitability potential requires the knowledge of multiple planetary parameters from observations.
  - This, in turn, demands hours of expensive telescope time.
  - It is a tedious job to scan thousands of planets manually and to identify planets potentially similar to Earth. Artificial Intelligence (AI) can be utilized effectively to find habitable planets.

## Conclusion

- The study identified a few planets which exhibit similar anomalous characteristics as Earth via the proposed technique, which shows reasonably good results, in agreement with what astronomers believe.
  - This method resulted in similar results in terms of anomalous candidate detection when it did not use surface temperature as a feature, compared to when it actually did.
  - This will make future analysis of exoplanets much easier.

## Energy-efficient method for Hydrogen production

### Why in News

- Scientists at the International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI), an autonomous institute of the Department of Science & Technology, Govt. of India, have developed a method that combines both the processes of electrolysis and reformation to produce hydrogen from methanol-water mixture by *Electrochemical Methanol Reformation (ECMR)* at ambient pressure and temperature.
- The main advantage of this process is that the electrical energy needed to produce hydrogen is 1/3rd of water electrolysis (Practical water electrolysis requires 55-65 kWh/kg of hydrogen).
- *This technology has been patented by ARCI.*



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## Brief Details of the Process

- In the ECMR process, which uses polymer electrolyte membrane (PEM), hydrogen can be produced at a lower temperature (25-60°C) and pressure, unlike chemical reformation.
  - Hydrogen separation or purification steps are not required since it is being well separated from CO<sub>2</sub> by the polymer membrane used in the system.
  - ARCI team is working on this technology and has developed an electrolysis unit of up to 5.0 kg/day capacity to produce hydrogen.
  - The corresponding energy requirement for the electrolyzer stack is around 17 kWh/kg.
  - The hydrogen thus produced by ARCI is highly pure (99.99%) and can be directly used in PEM fuel cells to generate power of about 11-13 kW.
- The core components of the PEM-based ECMR electrolyzer stack were fabricated indigenously and integrated with other components in the system.
- The electrolyzer stack was fabricated using exfoliated graphite material as a reactant flow field plate.
- Use of carbon materials as bipolar plates has been one of the significant achievements in replacing the titanium plates, which is otherwise normally used in electrolyzer unit assembly, offering a conservative cost-benefit.

## Why is Hydrogen so important?

- Hydrogen is gaining much attention due to its high specific energy value of 40 kWh/kg as compared to chemical fuels like gasoline, diesel, liquid petroleum gas (12-14 kWh/kg).
- The most abundant raw material containing hydrogen is water.
- It is also present in natural gas, petroleum, and biomass, and they can form the source for the generation of hydrogen.

## Conclusion

- Water electrolysis and reformation of hydrocarbon like methane are common methods for the production of hydrogen.
- For India's energy transition to clean fuels, adoption of green hydrogen from renewable energy, integrated water electrolysis process to generate energy would bring in significant benefits.
- With near-zero or zero end-use emissions and continually replenished fossil fuel resources, hydrogen can be an ideal sustainable energy carrier and would play an immense role in the near future.

## Warming in High Altitude Himalayas

### Why in News

- The recent research led by *Dr. Umesh Chandra Dumka* from Aryabhata Research Institute of Observational Sciences (ARIES), Nainital, an autonomous research institute of the Department of Science and Technology (DST) Govt. of India, showed that *Precipitable Water Vapour (PWV)* exhibits a positive radiative effect at the top of the atmosphere (TOA) in high altitude remote locations in the order of about 10 watts per square metre ( $W m^{-2}$ ) at Nainital (Altitude -2200m; Central Himalaya) and 7.4  $W m^{-2}$  at Hanle (Altitude -4500m; western Trans Himalaya).

### About Precipitable Water Vapor (PWV)

- The precipitable water vapor (PWV) is one of the most rapidly varying components in the atmosphere and is mainly accumulated in the lower troposphere.
- Due to the large variability in space and time, mixing processes, and contribution to a series of heterogeneous chemical reactions, as well as sparse measurement networks, especially in the Himalayan region, it is difficult to accurately quantify the climatic impact of PWV over space and time.
  - Moreover, aerosol-cloud-precipitation interactions over this region, which are one of the most climatic-sensitive regions, are poorly understood, apparently due to a lack of proper observational data.

## Conclusion

- The researchers assessed the combination of aerosols and water vapour radiative effects over the Himalayan range that is specifically important for regional climate and highlighted the importance of water vapour as a key greenhouse gas and climate forcing agent over the Himalayan region.

- The team believes that this work will provide a comprehensive investigation of the combined impact of aerosols and water vapour on the radiation budget.

## Gondwanaland break up & dispersal

### Why in News

- The study by the Indian Institute of Geomagnetism, Mumbai, an autonomous institute of the Department of Science & Technology, Govt. of India, has chalked the possible geological cross-sections along the GMR for the first time with the help of satellite-derived high-resolution gravity data.
  - The researchers postulated that the GMR may be underlain by an oceanic crust.
  - The results from their study can provide additional constraints in understanding the plate-tectonic evolution of the Indian Ocean, better.

### Background and Details of Findings

- The research work provides the crustal architecture and the state of gravitational equilibrium between Earth's crust and mantle (isostasy) of the *Greater Maldivé Ridge* segment of the larger *Chagos-Laccadive Ridge (CLR)* system.
  - The study, based mainly on the interpretation of *gravity anomalies (small differences in the pull of gravity caused by the lateral variations of density within the subsurface)* with broadband seismic and refraction seismic data, provided for the first time a three-dimensional picture of the variation of Moho along the Greater Maldivé Ridge and the adjoining ocean basins.
  - The depth to the boundary between the earth's crust and the mantle or the Mohorovicic discontinuity (Moho) over the GMR was systematically mapped along with the finer variation of effective elastic thickness ( $T_e$ ) at the place.
  - The research related to  $T_e$  variations and isostatic compensation has been published recently in the journal 'Gondwana Research'.
- IIG team found that Moho is deeper over the Maldivé Ridge (MR) segment and shallows southwards in the Deep Sea Channel region (DSC).
  - However, the effective elastic thickness (a proxy for the strength of the lithosphere) values were lower over the MR compared to the DSC region.
  - Maldivé Ridge and the Deep Sea Channel region may probably be oceanic in nature with the presence of underplated materials associated with the Reunion hotspot volcanism.
- The research suggests that Maldivé Ridge might have formed in the close vicinity of the Mid-Oceanic Ridge (where the creation of a new ocean floor occurs due to divergent motion of lithospheric plates or spreading centre).
  - Meanwhile, the DSC region was under a long transform fault (offset between the spreading centres, which neither create nor destroy lithosphere), which hindered melt production and gave rise to gap between Chagos and Maldivé Ridge during the Plume-ridge interaction.

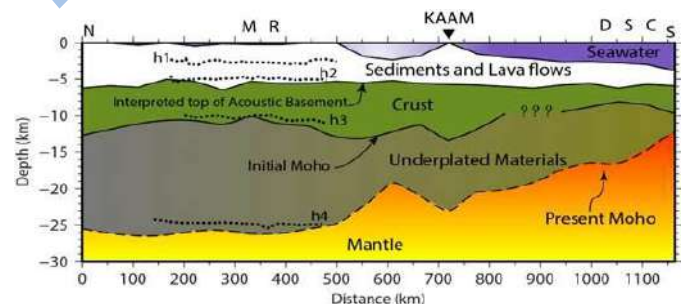


Figure. 1. Sketch showing a possible geological cross-section along a N-S profile (along 73.25° longitude) over the Greater Maldivé Ridge.

### About Maldivé Ridge

- The Maldivé Ridge is an aseismic ridge that is not associated with earthquake activities. This ridge, located in the western Indian Ocean, southwest of India, is not well investigated.
- It is of paramount importance to gain knowledge on the structure and geodynamics of aseismic ridges (as it provides valuable inputs towards understanding the evolution of ocean basins).

## FOREIGN AFFAIRS

Topic	Details
UK	<ul style="list-style-type: none"> <li>The 4th India-UK Home Affairs Dialogue was recently held in virtual mode.</li> <li>The Dialogue covered a wide range of issues including Homeland Security, Cyber Security, Extradition cases, Migration &amp; Mobility, etc. India impressed upon the UK authorities the need to expedite the pending extradition cases.</li> </ul>
Australia	<ul style="list-style-type: none"> <li>The India-Australia Comprehensive Economic Cooperation Agreement (CECA) is expected to be concluded in 12 months thereafter.</li> <li>The two nations are expected to sign the Interim Agreement in March 2022.</li> <li>The areas covered under the interim agreement should include goods, services, rules of origin, sanitary and phytosanitary measures, Customs procedures, and Legal and Institutional issues.</li> <li>Quad has brought the four countries, viz. USA, India, Australia and Japan closer and this had also enabled India and Australia to come closer to each other in economic relations as well.</li> <li><b>The 4<sup>th</sup> India - Australia Energy Dialogue was held on 15<sup>th</sup> February 2022.</b> The dialogue was co-chaired by Hon'ble Minister for Power and New &amp; Renewable Energy, <b>Mr. R.K. Singh</b> from the Indian side, and Hon'ble Minister for Energy and Emissions Reduction, Mr. Angus Taylor from the Australian side.               <ul style="list-style-type: none"> <li>Energy Transition was a major area of discussion in the dialogue.</li> </ul> </li> </ul>
Saudi Arabia	<ul style="list-style-type: none"> <li>In a historic and landmark visit, the Commander of the Royal Saudi Land Forces, Lieutenant General Fahd Bin Abdullah Mohammed Al-Mutair, arrived in India on 14 February 2022.</li> <li>This is the first-ever visit by a serving Royal Saudi Land Forces Commander to India and marks deepening bilateral defence cooperation between the two countries.</li> </ul>
UAE	<ul style="list-style-type: none"> <li>Prime Minister Shri Narendra Modi and Crown Prince of Abu Dhabi and Deputy Supreme Commander of UAE Armed Forces, H.H. Sheikh Mohamed bin Zayed al Nahyan have held a Virtual Summit on February 18, 2022.</li> <li>A major initiative in bilateral relations is the <i>Comprehensive Economic Partnership Agreement (CEPA)</i>.               <ul style="list-style-type: none"> <li>Negotiations for CEPA were launched in September 2021 and have been completed. The Agreement will take India-UAE's economic and commercial engagement to the next level.</li> </ul> </li> <li><i>UAE is India's third-largest trade partner</i>, and bilateral trade and investment ties are expected to see significant enhancements.</li> <li><i>India and UAE signed the historic Comprehensive Economic Partnership Agreement (CEPA) aimed at boosting the merchandise trade between the two countries to US\$ 100 billion over next five years.</i></li> </ul>
Germany	<ul style="list-style-type: none"> <li>The 8th Annual Meeting of the Indo-German Working Group on Quality Infrastructure, led by the Indian Ministry for Consumer Affairs, Food and Public Distribution and the German Federal Ministry for Economic Affairs and Energy was recently held in virtual mode.</li> </ul>

## SHORT LINERS

- World Radio Day:** Every year on February 13, people across the world celebrate World Radio Day in order to underline the importance of radio.
  - It was first proclaimed in 2011 by the member states of the United Nations Educational, Scientific, and Cultural Organization (UNESCO).
    - However, the day was later adopted in 2012 as an international day by the United Nations General Assembly.
  - This year's theme for World Radio Day is "**Radio and Trust**".

- There are 3 main sub-theme of World Radio Day 2022 are:
  - a. Trust in radio journalism.
  - b. Trust and Accessibility.
  - c. Trust and viability of radio stations.
- 2. **Agricultural Products Export Development Authority (APEDA) celebrated its 36th Foundation Day on 13th February, 2022.**
  - APEDA actively supported the Government in taking the export of agricultural products to USD 20.67 billion in 2020-21 from USD 0.6 billion in 1986 when it was founded.
  - APEDA also helped expand the export basket to 205 countries.
  - The share of APEDA exports (USD 20.67 billion) constituted 49% of overall agri- product exports in 2020-21 out of which, Cereals and fresh horticulture comprised 59%, Cereal preparations, and miscellaneous processed items 23% and animal products 18%.
- 3. **River Devika project :** Union Minister Dr Jitendra Singh has recently said that the historic River Devika project, built at the cost of over Rs 190 crore, will be complete by June this year.
  - North India's first river rejuvenation project will offer a unique destination both for pilgrim tourists as well as recreation tourists, in addition to being a state-of-the-art cremation center.
  - Devika river originates from the hilly Suddha Mahadev temple in Udhampur district of Jammu and Kashmir and flows down towards western Punjab (now in Pakistan) where it merges with the Ravi river.
    - The river holds religious significance as it is revered by Hindus as the sister of river Ganga.
    - In June 2020, Devika Bridge was inaugurated in Udhampur. Apart from taking care of traffic congestion, the Devika Bridge was also meant to help smooth the passage of Army convoys and vehicles.
- 4. Pradhan Mantri Jan Arogya Yojana (PM-JAY) "SEHAT" is the largest health insurance scheme that aims at providing a health cover of Rs. 5 lakhs per family per year for secondary and tertiary care hospitalization across public and private empanelled hospitals in India.
- 5. **Commander-in-Chief Andaman and Nicobar Command (CINCAN)** congratulated the Coast Guard Component on the occasion of the Indian Coast Guard's 46th Raising Day on February 01, 2022.
- 6. Union Minister of State (Independent Charge) Science & Technology, Dr. Jitendra Singh today said that Chandrayaan-3 is scheduled for launch in August 2022.
- 7. **ISRO has launched a total of 129 satellites of Indian Origin and 342 foreign satellites belonging to 36 countries of which nearly 39 satellites are commercial satellites and the rest are nano-satellites since 1975.**
  - The satellite-enabled data and services are being used for the benefit of various sectors of the country. These include Television broadcasting, Direct-to-Home, ATM, Mobile communication, tele-education, telemedicine, and advisories on weather, pest infestation, agro-meteorology, and potential fishing zones.
  - Satellite data is also used for crop production estimation, crop intensification, agricultural drought assessment, wasteland inventory, identifying groundwater prospect zones, inland aquaculture suitability and disaster risk reduction.
- 8. **Greenfield Airports Policy, 2008:** Greenfield Airports Policy, 2008 provides guidelines, procedures and conditions for the establishment of new Greenfield Airports in the country.
  - Under the Greenfield Airports Policy, the Government of India has so far accorded 'in-principle' approval for setting up of 21 Greenfield Airports across the country namely Mopa in Goa, Navi Mumbai, Shirdi and Sindhudurg in Maharashtra, Kalaburagi, Bijapur, Hassan and Shimoga in Karnataka, Datia (Gwalior) in Madhya Pradesh, Kushinagar and Noida (Jewar) in Uttar Pradesh, Dholera and Hirasar in Gujarat, Karaikal in Puducherry, Dagadathi, Bhogapuram and Oravakal in Andhra Pradesh, Durgapur in West Bengal, Pakyong in Sikkim, Kannur in Kerala and Hollongi (Itanagar) in Arunachal Pradesh.
- 9. To create a global awareness on the preservation of monuments and heritage, **National Monuments Authority** has organized a Webinar in collaboration with ICCR (MEA) on "Protection of the Monuments and their significance for the Preservation of National Heritage" on 11th February, 2022, the memorial day of Pt. Deendayal Upadhyay.

10. Minister for State for Education Dr. Subhas Sarkar recently presented the 5th National Award for Innovations and Good Practices in Educational Administration virtually today.
  - The **National Institute of Educational Planning and Administration (NIEPA)** has instituted National Award for Innovations and Good Practices in Educational Administration for District and Block Level Education Officers.
  - The fifth award presentation function was organized by NIEPA virtually today.
  - The National Award or Certificate of Appreciation was presented to the selected District and Block level education officers from 29 states/ UTs of the country.
  
11. The virtual inaugural session of India's participation in the annual film market at Berlin, called EFM or the European Film Market which is organised on the sidelines of the Berlin International Film Festival, was recently held.
  
12. A Memorandum of Understanding (MoU) has been signed between the Governments of Haryana and Himachal Pradesh for the construction of the *Adi Badri Dam on River Somb in Himachal Pradesh*, along with its linkages with Saraswati River.
  - As per the MoU, a committee comprising of senior officials from the two States has been constituted for planning, supervising, and monitoring of the dam.
  - Further, Himachal Pradesh Power Corporation Limited has been identified as executing agency for construction of the dam and its related infrastructure/ appurtenant works.
  - The MoU also stipulates that the funds for the project are to be arranged by Government of Haryana.
  
13. **Two National Centres of Excellence in Carbon Capture and Utilization are being established in India.**
  - The two Centres, namely the National Centre of Excellence in Carbon Capture and Utilization (NCoE-CCU) at Indian Institute of Technology (IIT) Bombay, Mumbai, and the National Centre in Carbon Capture and Utilization (NCCCU) at Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru are being set up with support from the Department of Science & Technology, Govt. of India.
  - These CoEs will facilitate capturing & mapping of current R&D and innovation activities in the domain and also develop networks of researchers, industries, and stakeholders with coordination and synergy between partnering groups and organizations.
  - The Centres will act as multi-disciplinary, long-term research, design development, collaborative and capacity-building hubs for state-of-the-art research and application-oriented initiatives in the field of CCU.
  
14. The Ministry of Tourism has identified Eco Circuit as one of the fifteen thematic circuits for development under the Swadesh Darshan Scheme to promote eco-tourism in the country.
  - The Ministry of Tourism has sanctioned 06 projects under Eco Theme in 'Swadesh Darshan'.
  - The Ministry has signed a Memorandum of Understanding (MoU) with the *United Nations Environment Programme (UNEP)* and *Responsible Tourism Society of India (RTSOI)* on 27th September, 2021 with the purpose to undertake measures to actively promote and support 'sustainability initiatives' in the tourism sector of each other and work in a collaborative manner wherever possible.
  
15. Under the **Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP)** being implemented by the Department of Pharmaceuticals, a medicine is priced on the principle of a maximum of 50% of the average price of the top three brands of the said medicine.
  - Thus, the prices of Jan Aushadhi Medicines are cheaper at least by 50% and in some cases, by 80% to 90% of the market price of the branded medicines.
  - Pharmaceuticals & Medical Devices Bureau of India (PMBI), the implementing agency of the Scheme has presently its warehouses situated at Gurugram, Chennai and Guwahati.
  - A total of six warehouses are envisaged by March 2025.
  
16. **Security Printing and Minting Corporation of India Limited (SPMCIL)** celebrated its 17th Foundation Day programme today through the digital mode.
  - **Ms. Tripti Patra Ghosh** is the present CMD of SPMCIL.

17. The Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying is implementing a flagship scheme namely *Pradhan Mantri Matsya Sampada Yojana (PMMSY)* with the highest ever investment of Rs. 20,050 crore for a period of 5 years with effect from 2020-21 to 2024-25 in all the States/Union Territories.
  - PMMSY inter-alia provides support for the promotion of cold water fisheries with a special focus on the establishment of Trout Fish hatcheries, construction of raceways, inputs for Trout rearing units, construction of new ponds, the establishment of *Recirculatory Aquaculture system(RAS)*, establishment of cages for the culture of fish and also post-harvest infrastructure facilities.
18. *Medical Council of India (Professional Conduct, Etiquette and Ethics) Regulations, 2002* provides that every physician should as far as possible prescribe drugs with generic names.
  - Further, the erstwhile Medical Council of India (MCI) had issued Circulars in which all the Registered Medical Practitioners were directed to comply with the aforesaid provisions.
19. The Election Commission of India (ECI) has informed that a committee was formed comprising of Shri Harish Kumar, Retd. IRS Officer, *Shri Umesh Sinha*, Secretary General, ECI, Shri Chandra Bhushan Kumar, Senior Deputy Election Commissioner, ECI and DG (Expenditure) to study the cost factors and other related issues, and make suitable recommendations.
  - The ECI has accepted the recommendations of the Committee and sent its recommendations to the Government.
20. *National Legal Services Day* is observed every year on 9th November to commemorate the commencement of Legal Services Authorities Act, 1987 which came into force on 9th November, 1995.
  - On National Legal Services Day, legal awareness camps are held by State Legal Services Authorities across the country to apprise people about the availability of free legal aid.
21. **In order to fulfill the commitment to provide a World Class Wrestling academy in Railways, a work has been sanctioned to establish the same at Kishanganj, Delhi at an approximate cost of Rs. 30.76 crores and will be another feather in the Cap of Railways.**
22. Union Minister for Road Transport and Highways Shri Nitin Gadkari inaugurated 14.5 km long Rail-cum-Road-bridge over Ganga River approach project on NH 333B in Munger, Bihar at a cost of Rs.696 crore.
23. A team of Indian Scientists has recently identified the next-generation probiotic bacterium *Lactobacillus Plantarum JBC5* from a dairy product that showed great promise in promoting healthy aging.
24. Atal Innovation Mission (AIM), NITI Aayog in collaboration with UNDP, India today launched the Community Innovator Fellowship (CIF) marking the "International Day of Women & Girls in Science".
  - The fellowship is developed as a pre-incubation model which will provide youth with an opportunity to establish their social enterprise focusing on Sustainable Development Goal (SDG) based solutions for solving community issues.
  - This is a one-year-long intensive fellowship program, designed for aspiring community innovators, irrespective of their socio-economic background.
25. *Fintech Open month* has commenced from 07 February 2022. The main objective is to bring together regulators, Fintech professionals and enthusiasts, industry leaders, the start-up community, and developers on a common platform to collaborate, exchange ideas, and innovate.
  - FinTech month with the overarching theme 'OPEN' aims to achieve three key objectives –
    - a. Encourage an OPEN ecosystem across the FinTech industry.
    - b. Foster co-innovation and growth.
    - c. Ensure financial inclusion and leverage new models like Account Aggregator to unleash the next wave of fintech innovation.
  - As a part of the Fintech Open Month, *NITI Aayog in association with PhonePe will be hosting the first-ever open-to-all Hackathon* event for ideating and coming up with the most creative solutions for the FinTech space.
26. *Andaman & Nicobar Command (ANC) conducted a joint security exercise at Port Blair airfield on February 16, 2022.*

- The aim of the drill was to test the preparedness of all security agencies during various contingencies like terrorist attack, hostage crisis and hijack situation at the airfield or elsewhere.
27. **Union Minister of Ports, Shipping and Waterways & AYUSH Shri Sarbananda Sonowal has recently virtually flagged off the 'Most Awaited' Water Taxi for citizens of Mumbai, from Belapur Jetty.**
- The Water Taxi services are going to give huge impetus to the tourism sector, especially travel to the historic Elephanta caves from Navi Mumbai. Visitors will be able to travel easily from Navi Mumbai to Gateway of India.
  - The new jetty will enable movement of vessels to locations like Bhaucha Dhakka, Mandwa, Elephanta and Karanja.
28. **The Ministry of Tourism in order to boost tourism throughout the country signed a Memorandum of Understanding with M/s Alliance Air Aviation Limited (AAAL) on 17th February, 2022 at New Delhi.**
29. The celebrations of the First Day of the auspicious and much-awaited biennial "MedaramJathara" commenced on the 16th of February 2022 as the arrival of Saralamma on to the 'Medaram Gaddhe' (Platform) was undertaken by the *Koya Tribe of Telangana*.
- Medaram Jathara is the second-largest fair of India, after the Kumbh Mela, celebrated by the second-largest Tribal Community of Telangana- the Koya tribe for four days.
  - As the largest tribal fair in Asia, MedaramJathara is conducted in honour of the Goddesses Sammakka and Saralamma.
  - It is celebrated once in two years in the month of 'Magha' (February) on the full moon day. Saralamma was the daughter of Sammakka.
  - Her idol, according to the rituals, is installed in a temple at Kannepalli, a small village near Medaram.
30. First direct flight between Delhi and heritage city of Khajuraho was recently flagged-off. With this, 405 routes would be operationalized under the UDAN-RCS scheme.
- SpiceJet was awarded the Delhi-Khajuraho-Delhi route under the RCS-UDAN 3.0.
31. *The Government of India, the State Governments of Karnataka and Odisha and the World Bank have signed a \$115 million (INR 869 crore) Programme (Rejuvenating Watersheds for Agricultural Resilience through Innovative Development Programme) that will help national and state institutions adopt improved watershed management practices to help increase farmers' resilience to climate change, promote higher productivity and better incomes.*
32. *NHPC Limited has set up a new wholly owned subsidiary company namely "NHPC RENEWABLE ENERGY LIMITED (NREL)", for development of Renewable Energy, Small Hydro and Green Hydrogen based business of NHPC Ltd.*
- The Subsidiary has been incorporated with the Registrar of Companies, NCT of Delhi & Haryana.
  - Currently, NHPC's total installed generation capacity stands at 7071 mega-watt (MW) which includes 100 MW of Solar/ Wind energy-based plants. Another 5999 of Hydro and 105 MW of Solar Plants are under construction.
  - *Recently, NHPC signed Letter of Intent with Rajasthan Renewable Energy Corporation Limited (RRECL) for "Development of 10000 MW Renewable Energy Projects / Parks in Rajasthan".*
33. **International Mother Language Day was observed worldwide on 21st February every year to promote awareness of linguistic and cultural diversity and to promote multilingualism.**
- The Day is part of a broader initiative to promote the preservation and protection of all languages used by people of the world.
  - The idea to celebrate International Mother Language Day first came from Bangladesh.
  - The general conference of the United Nations Educational, Scientific and Cultural Organization (UNESCO) decided to celebrate February 21 as International Mother Language Day in 2000
  - *The theme of 2022 is: "Using technology for multilingual learning: Challenges and opportunities", it focuses on potential role of technology to advance multilingual education and support the development of quality teaching and learning for all.*
34. **As part of the National Supercomputing Mission (NSM), the Indian Institute of Science (IISc) Bengaluru has installed Param Pravega, one of the most powerful Indian supercomputers.**

- Param Pravega having a supercomputing power of 3.3 petaflops, is the largest supercomputer that has been installed in an Indian academic institution.
35. The *Ramanujan Prize for Young Mathematicians* was awarded to *Professor Neena Gupta*, a mathematician of the Indian Statistical Institute in Kolkata, in a virtual ceremony on 22nd February 2022.
- She received the award for the year 2021 for her outstanding work in affine algebraic geometry and commutative algebra.
  - It is given to young mathematicians less than 45 years of age who have conducted outstanding research in a developing country.
  - It is supported by DST in the memory of Srinivasa Ramanujan, a genius in pure mathematics who was essentially self-taught and made spectacular contributions to elliptic functions, continued fractions, infinite series, and analytical theory of numbers.
  - *The prize is awarded annually to a researcher from a developing country funded by the Department of Science and Technology (DST) of the Government of India in association with ICTP (International Centre for Theoretical Physics) and the International Mathematical Union (IMU).*
36. A joint team of scientists from Defence Research and Development Organisation (DRDO) and Indian Institute of Technology (IIT) Delhi, for the first time in the country successfully demonstrated Quantum Key Distribution link between Prayagraj and Vindhyachal in Uttar Pradesh, a distance of more than 100 kilometres.
- This technological breakthrough was achieved over a commercial grade optical fibre already available in field.
37. **EXERCISE MILAN-2022** : The latest edition of Indian Navy's multilateral exercise MILAN 2022 is scheduled to commence from 25 Feb 22 in the 'City of Destiny', Visakhapatnam.
- MILAN is a biennial multilateral naval exercise incepted by Indian Navy in 1995 at Andaman and Nicobar Command.
  - MILAN 22 will witness its largest ever participation, with more than 40 countries sending their warships/ high level delegations.
  - The theme of the MILAN 2022 exercise is '*Camaraderie - Cohesion - Collaboration*' which aims to project India as a responsible maritime power to the world at large.
38. **Ex Cobra Warrior 22** : Indian Air Force will participate in a multi nation air exercise named 'Ex Cobra Warrior 22' at Waddington, UK from 06 to 27 March 2022.
- IAF Light Combat Aircraft (LCA) Tejas will participate in the exercise along with fighter aircraft of UK and other leading Air Forces.
  - The exercise is aimed at providing operational exposure and share best practices amongst the participating Air Forces, thereby enhancing combat capability and forging bonds of friendship.
  - This will be a platform for LCA Tejas to demonstrate its manoeuvrability and operational capability.
39. The National Tribal Research Institute, New Delhi and Bhartiya Adim Janjati Seva Sangathan (BAJSS) signed an MoU for developing BAJSS as resource center of NTRI in the presence of Sh. Arjun Munda, Minister of Tribal Affairs on 21st February 2022.
40. Gas Authority of India Limited has commenced India's first-of-its-kind project of mixing hydrogen into natural gas system at Indore, Madhya Pradesh.
- *The hydrogen blended natural gas will be supplied to Avantika Gas Limited, one of GAIL's Joint Venture (JV) Company with HPCL, operating in Indore.*
41. The fifth submarine of Project 75, Yard 11879, Indian Navy's Kalvari class commenced sea trials on 01 Feb 22.
- The submarine was launched in Nov 2020 from the KanhojiAngre Wet Basin of Mazagon Dock Shipbuilders Limited (MDL).
  - The submarine would be named Vagir, after commissioning.
42. Ministry of Tourism has included Punaura Dham in the Ramayana circuit of Swadesh Darshan Scheme. The destination of Punaura Dham has been recently included under PRASHAD Scheme of the Ministry of Tourism.

43. **Thirty-Nine (39) Towns have been recognized as Towns of Export Excellence (TEE) under the Foreign Trade Policy 2015-20 (extended up to 31.03.2022).**
- Recognized associations of units in Towns of Export Excellence can avail financial assistance under Market Access Initiative (MAI) scheme, on priority basis, for export promotion projects for marketing, capacity building and technological services.
  - Common Service Providers in the Towns of Export Excellence are entitled for Authorisation under Export Promotion Capital Goods (EPCG) Scheme.
44. The Government has initiated action for development of tourism at the following five Light houses in the state of Odisha on Public-Private Partnership (PPP) mode:-
- Gopalpur Lighthouse – District Ganjam
  - Puri Lighthouse – District Puri
  - Chandrabhaga Lighthouse – District Puri
  - Paradip Lighthouse – District Jagatsinghpur
  - False Point Lighthouse – District Kendrapara
- The project components for the above Lighthouses have been finalized and necessary clearances from State Coastal Zone Management Authority for Coastal Regulation Zone (CRZ) clearance and other local bodies have been sought.
  - Since the above projects are on PPP mode, no fund allocation is envisaged.
45. Atal Innovation Mission (AIM), NITI Aayog, and the U.S. Agency for International Development (USAID) announced a new partnership under the Sustainable Access to Markets and Resources for Innovative Delivery of Healthcare (SAMRIDH) initiative, which will improve access to affordable and quality healthcare for vulnerable populations in tier-2 and tier-3 cities, and rural and tribal regions.
46. **National Ayush Mission (NAM):** Cost-effective Ayush services under the National Ayush Mission (NAM) have gotten total allocation of budget to Ayush Ministry in last 7 years has increased over four times from 691 Cr to Rs 3050 Cr.
47. The **Global Centre for Traditional Medicine (GCTM-WHO)** in India is being set up and the budgetary provisions have been done for the establishment of the centre.
- Establishment of WHO (GCTM) in India will directly affect investment in traditional medicine sector in India.
48. **North East Special Infrastructure Development Scheme :** Under the North East Special Infrastructure Development Scheme (NESIDS), financial assistance is provided for projects of physical infrastructure relating to water supply, power, connectivity to promote tourism; and for projects of social sector for creation of infrastructure for primary and secondary education and health.
- So far, 110 projects worth Rs.2563.14 crore have been sanctioned in the North Eastern States under NESIDS, which are at various stages of implementation.

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# NEP-2020: Vision and Pathways

## Introduction

- The new National Education Policy-2020 has recently been announced and is currently under implementation.
  - It envisions to have an education system, with equitable access to the highest quality education for all learners regardless of social or economic background.
- The vision of NEP-2020 is in sync with *Goal 4 of the UN Sustainable Development Goal (SDG4)*, which seeks 'to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

## Aim and Objectives

- The New Education Policy is aligned with India's aspirational goals of 21st century and it proclaims to transform India into a global knowledge superpower.
- Based on the vision, NEP-2020 has set 2040 as the deadline to fulfil the goals, targets, and pathways so that the child who gets entry into the education system under the new policy would exit with having gone through the new policy processes.

## Thrust areas

- Universalisation of Education:** The New Education Policy aims at universalising school education (achieving 100% GER i.e. Gross Enrolment Ratio in preschool to secondary level) by 2030 and higher education (increasing the GER in higher education to 50 %) by 2035.
  - It is expected that universalisation of school education will provide scope for maximising enrolment in higher education.
  - The policy also suggests to undertake measures to bring back drop-out children to schools and to prevent this from occurring further.
- Curricular and Pedagogical Restructuring:** NEP-2020 envisages restructuring of the existing curriculum and pedagogy in both school and higher education.
  - It recommends modifying the existing 10+2 pedagogical structure in the form of a new structure of 5+3+3+4, having a strong base of *Early Childhood Care and Education (ECCE)* from the age of 3 years.
  - The policy recommends universal provisioning of quality early childhood care and education based on strong pedagogical components to be achieved by 2030.
  - It considers the 3-8 years age as the foundational stage of a child critical for his/her overall development and every student should attain foundational literacy and numeracy (FLN) by grade 3.
- Multidisciplinary Education:** It is based on liberal education is an academic and pedagogical approach to develop multiple capacities in the students by integrating formal and informal learning opportunities.
  - It would require restructuring of the Pedagogical Curriculum.
  - The policy also recommends building world class multidisciplinary Higher Education Institutions (HEIs) called *Multidisciplinary Educational Research University (MERU)*.
- Equity and Inclusion in Education:** NEP 2020 envisages achieving Equitable and Inclusive quality education for all.
  - It considers equity as an inclusive notion focusing on Socio-Economically Disadvantaged Groups (SEDGs) and areas.
  - Recognising the large intra-state variations, the policy recommends declaring the regions with large populations from the disadvantaged groups as Special Education Zones (SEZs), where all the schemes and policies can be implemented more effectively.
- Reforms for Effective Governance:** The policy sets up transformative agenda in governance using a 'Light but Tight' Approach. The idea behind creating a single regulator is to initiate the problems of over-regulation in higher and professional education.
  - In school education, some of the major reforms include:
    - ✓ Setting up school complexes/clusters.
    - ✓ Setting up of school standards and authority.
    - ✓ Reforming school examination boards.
  - The governance reforms in higher education include setting up a single regulator on *Higher Education Commission of India (HECI)* with four verticals for regulation, namely
  - National Higher Education Resource Centre (NHERC) accreditation,
  - National Assessment and Accreditation Council (NAAC),

- funding Higher Education Grants Council (HEGC),
- Academic setting of General Education Council (GEC).
- f. **Standard Setting and Accreditation for School and Higher Education:** NEP-2020 advocates for the institutionalisation of effective quality assurance and accreditation system by establishing *State School Standards Authority (SSSA)* as an independent state wide body.
  - In higher education the policy envisages to set up NAC as one of the verticals of HECI.
- g. **Vocational Education:** NEP envisages strengthening the skills component in general education and raise the status of vocational education by integrating it into the mainstream formal education.
  - It is expected that by 2025, over 50% of the learners through the school and higher education system will have exposure to vocational education.
- h. **Quality Academic Research:** The policy advocates for developing a strong culture of research and knowledge creation to make India a knowledgeable superpower.
  - It calls for setting up the National Research Foundation (NRF) with a special mandate to foster research and innovation in universities and colleges including interdisciplinary research.
- i. **Use of Technology:** The new NEP 2020 proposes to set up a *National Educational Technology Forum (NETF)* to serve as a platform to better the ideation process, improve learning, assessment, planning, and administration. This policy aims to see that technology is appropriately integrated into all levels of education for:
  - improving teaching, learning, and evaluation processes;
  - supporting the preparation of teachers and their continuous professional development;
  - enhancing educational access to disadvantaged groups;
  - streamlining educational planning, administration, and management.
- j. **Raising Public Expenditure on Education:** The policy commits to raise the public expenditure on education to the recommended level of 6% of GDP as envisaged by the 1968 Policy.
  - The policy also identifies the following areas for financing to cultivate an education system:
    - a. universal provisioning of quality early childhood care education.
    - b. ensuring foundational literacy and numeracy.
    - c. providing adequate and appropriate resourcing of school complexes/clusters;
    - d. providing food and nutrition (breakfast and midday meals).
    - e. investing in teacher education and continuing professional development of teachers.
    - f. revamping colleges and universities to foster excellence.
    - g. cultivating research.
    - h. extensive use of technology and online education.
- k. **Internationalisation in Education:** NEP-2020 advocates for greater internationalisation in education by creating avenues for having larger number of international students studying in India and providing opportunities to students interested in studying abroad.
  - High performing Indian universities will be encouraged to set up campuses in other countries, and similar selected universities, e.g., those from among the top 100 universities in the world will be facilitated to operate in India.
  - A legislative framework facilitating such entry will be put in place, and such universities will be given special dispensation regarding regulatory, governance, and content norms on par with other autonomous institutions of India.
- l. **Promotion of Indian Languages, Art and Culture:** NEP-2020 has proposed establishing an Indian Institute of Translation and Interpretation (IITI) to promote Indian languages.

Universalization	Equity and Inclusion	Vocational Education	Technology
Pedagogical Restructuring	Effective Governance	Quality Research	Raising Public Expenditure
Multidisciplinary	Standard Setting	Promotion of Indigenous Culture, Art and Language	Internationalization

Thrust Areas of NEP-2020

## Conclusion

- The vision of the National Education Policy-2020 is quite comprehensive and long standing.
- The gaps between the current and desired educational outcomes are to be bridged by major systemic reforms and suitable strategies/ programme interventions from early childhood through higher education.
- The policy is both global and local in its outlook and intent.
- It has put quality education as the topmost agenda of educational reforms, strengthening the foundations of education, catering to the educational needs of the most disadvantaged, and making India a global leader in education.

## Assessment Reforms

### Introduction

- Examinations, in Indian education system have been extremely content heavy, leading to rote memorisation and narrowing down of the syllabus that gets transacted in schools.
  - As a result, assessments do not live up to the potential they have in ensuring quality education.
- We need a progressive system of assessment that could lead the path towards quality education in schools.
- Assessments need to be more comprehensive, to measure not only learning of the textbook, but also other abilities like analysis, critical thinking, creativity, socio-emotional skills, etc.

### What NEP, 2020 has proposed?

- In this context, the National Education Policy (NEP) 2020 suggests certain fundamental reforms in the purpose, design, and implementation of assessment.
- To begin with, the very culture of assessment in our schooling system must change to become more constructive, developmental, and learning-focused.
- Assessment needs to be visualised as an ongoing process that is instrumental in understanding how students think and learn.

### Role of assessment

- Evidences about student learning emerging from assessment data should be used for analysing and interpreting how it is best to address students' learning needs.
  - This will also enable teachers in introspecting about the effectiveness of teaching strategies by providing valuable insights on what and how to change.
  - It will also provide inputs to schools on how much they are able to function as learning institutions by reflecting on their processes, their culture, and curriculum.
- At the systemic level, thoughtfully designed and administered assessments will provide inputs to policy-makers about the overall performance of the ecosystem with reference to key learning in the context of specific geographies and diverse socio-economic groups.
- The role of assessment to enable learning must be centre-stage- for this, all involved, whether teachers, schools, parents, system must understand that assessment is to enable learning of students and help them realise the goals of education.

### Recommendations for transforming Board examinations

- NEP 2020 suggests redesigning of Board examinations to make them more valid, reduce academic stress and pressure, and de-emphasise coaching culture.
- The Board examinations should primarily assess core capacities rather than content memorisation.
- The focus of such certification examinations should be on holistic learning and development rather than a narrow range of content or textbook material learnt in a single stream.
- In this context, NEP 2020 offers choice and flexibility to students to reduce the stress and anxiety currently associated with Board examinations.
- Concomitant with the above suggested reforms, NEP 2020 also discusses the need for a holistic, 360-degree, multidimensional report that reflects in great detail the progress as well as the uniqueness of each student in the cognitive, affective, and psychomotor domains.

### Following principles are needed for achieving above recommendations

- 1. Building consensus among stakeholders:** Institutions need to actively collaborate and maintain continuous dialogue. For example, NCERT, SCERT, and Boards should together work towards reforming the curriculum, the syllabus, and associated assessments.
  - It will be impossible to change one in the absence of reform in the other.
  - It is also important to recognise the need for a deep alignment between curricular goals and assessment processes.
  - Such collaboration need not be limited to only government institutions.
- 2. Agreement among stakeholders on what are the core and essential competencies** that must be assessed through various systems of assessment.
  - To enable this, we need contextualised learning standards, competency frameworks, and assessment processes for all subjects.
  - The learning standards will provide a common vocabulary among stakeholders.
  - These standards must take into account higher order thinking skills, 21<sup>st</sup> century skills, and socio-emotional skills that are needed for holistic development of students.
  - Such standards and frameworks must provide adequate direction to teachers, curriculum designers, and Board examination paper setters in assessing appropriate and relevant competencies.
  - This will also enable equivalence across Boards, something that is sorely missing in our schooling system today.
  - It is practically impossible to compare performance across Boards in the absence of such commonly shared frameworks of standards and processes.
  - These standards and processes need to be developed collaboratively and disseminated among key stakeholders.
- 3. Generating awareness among key stakeholders:** In the context of Boards, any change in the policy envisages a shift in assessment, both at the classroom and school level as well as the systemic level.
  - Therefore, generating awareness among key stakeholders, such as teachers, parents, school principals, block/district officers, etc., is necessary to successfully implement these changes.
- 4. Key stakeholders entrusted with the task of assessment and evaluation must be provided ongoing capacity building** on various aspects of assessment.
  - In addition to teachers, training and capacity building of paper setters, evaluators, and moderators of Board examinations should also be undertaken to enable these improvements.

### Steps taken by CBSE to facilitate assessment reforms

- It has provided training to its teachers on various pedagogic and assessment reforms suggested in NEP 2020.
- It has undertaken various definitive measures in the past few years to include key competencies in Board examinations.
- It has conducted an exhaustive review of its certification examination (Board) papers to evaluate the reliability and validity of the test instruments.
- In order to support teachers with implementing competency based education, learning standards framework for various subjects at secondary, and senior secondary level have been developed in alignment with the NCERT learning outcomes.
- To provide equal attention to the growth of learners in all aspects of development, *Holistic Progress Cards (HPCs)* have been developed.
  - The HPC will form an important link between the home and school, and will capture the uniqueness of each learner in the cognitive, affective, and psychomotor domains as opposed to the conventional report cards which measure the achievements of children in quantitative terms, only once in an academic year.
- It has also initiated efforts to build capacity of Board personnel in standards and processes of test development and standardisation.
- The handbooks, guidebooks, and other reference materials have been developed to be used as reference materials for test developers.
- CBSE has collaborated with various government and not-for-profit institutions in instituting these changes.

## Conclusion

- Assessment reform has been in the discourse for several decades now. NEP 2020 reiterates key areas of reforms from reports and policies that preceded it.
- Therefore, the need to build on what exists, to learn from what has worked before, and the lessons learnt are vital.
- We need to be creative and innovative in our efforts and solutions to transform the way assessments are perceived and used across our country.
- The continuity of effort towards the envisaged processes and systems must be the basis of all action- creating repositories of best practices will enable consolidation of efforts, as will dialogue and collaborative action across institutions.

## Reinventing Teacher Education

### Introduction

- India's aspiration to become a knowledge society, reverberating with educated and skilled individuals of high standards that are required to meet the challenges of the 21st century will require us to ensure a strong foundation to our school education system.
- Based on the principles of equity, quality, accessibility, and affordability, the National Education Policy, 2020 brings the focus back on the children as well as teachers. National Education Policy's stated goal is to "reinstate" teachers as the "most respected members of our society."
- Empowerment of teachers remains a recurrent theme in the policy, and it is understood that this can be achieved by ensuring their "livelihood, respect, dignity and autonomy", while ensuring quality and accountability.

### Evolution of Teacher Education

- In the ancient times in India, teaching in the pristine environs of 'gurukuls' was truly multidisciplinary as it focussed on teaching life skills, martial skills, and imparting the teaching of "Vedas".
- A formal system of teachers' training was introduced in India during the spread of Buddhism.
  - The monastic system was prevalent in which every learner was to be placed under the supervision and guidance of a preceptor (Upajjhaya).
  - The current style of schooling and teaching emerged during the British rule in India.
  - Inspired by the Victorian schooling system, this system focused on a behaviourist paradigm where education was concerned with preparing students to be disciplined, English-speaking clerks, to submissively execute the tasks of the British administration.
  - It prepared teachers too as mechanics mainly concerned with classroom teaching.
- There has been a slow paradigm shift in the system of teacher education in India, with the successful introduction of *National Curriculum Framework (NCF)-2005*, *National Curriculum Framework for Teacher Education (NCFTE) 2009*, and *Right to Education Act (RTE), 2009*.
- Over time, the focus of the system has shifted away from disciplinarian, rote memorisation, to a collaborative construction of knowledge.

### Present Day Situation

- Following the NCF 2005 and NCFTE, 2009, the teacher education strategy is aimed at imbuing the teachers with skills to become facilitators of knowledge rather than gatekeepers of information as well as to make teaching less textbook-oriented and to connect knowledge to life outside the school.
- The *Justice Verma Commission in 2012* also stressed upon the need to improve the quality of pre-service and in-service teacher education.
- In 2014, the erstwhile *Ministry of Human and Resource Development (MHRD)* restructured its *B Ed. programme* by doubling the duration of the programme to two years.
- The new teacher education curriculum, designed by the *National Council for Teacher Education (NCTE)* introduced several changes in the curriculum such as Yoga education, ICT, peace and value education, health and physical education, environmental education and population education.

### Challenges

- Teacher Education institutions have been working in isolation from rest of the Higher Education Institutions (HEIs).

- The multidisciplinary education, essential in developing a well-rounded personality, has been missing in the Teacher Education Institutions, which hitherto have been operating in a stand-alone manner.
- There has been no system to ensure only motivated and meritorious individuals select teaching as a profession.

## Teacher Education Post NEP- 2020

- NEP 2020 has proposed to revise and revamp aspects of teacher education, in line with the current trends, including its structure, regulation, and governance, through radical action so as to raise standards and restore integrity, credibility, efficacy, and high quality to the teacher education in the country.
- Recognising the 'power of teacher', NEP 2020 has put in place systemic reforms that would help 'teaching' emerge as an attractive profession of choice for bright and talented young minds and has put in place different interventions like
  - Integrated Teacher Education Programme (ITEP),
  - National Professional Standards for Teachers (NPST),
  - National Mission for Mentoring (NMM)
  - At least 50 hours of Continuous Professional Development (CPD) for every teacher in a year.

### 1. Integrated Teacher Education Programme (ITEP)

- The four-year *Integrated Teacher Education Programme (ITEP)*, a dual-major holistic bachelor's degree programme offering B.A., B.Ed. /B.Sc., B. Ed., and B.Com. B.Ed., will be the minimum entry requirement for teachers.
- ITEP will teach cutting-edge pedagogy and offer a foundation in Early Childhood Care and Education (ECCE), Foundational Literacy and Numeracy (FLN), toy-based pedagogy, stage-based pedagogy, inclusive education, and a comprehension of India and its values/ ethos/art/traditions, among others.

### 2. National Professional Standards for Teachers (NPST)

- The roll out of *National Professional Standards for Teachers (NPST)* is a continuum in teacher education so far as it would cover expectations for the role of teacher at different levels of expertise/experience at different stages of his/her career, and the competencies required for that stage.

### 3. National Mission for Mentoring (NMM)

- *National Mission for Mentoring (NMM)* for schools be operationalised by NCTE by creating a large pool of outstanding senior/retired faculty as potential mentors and mentees (school teachers, Principals, teacher educator etc.), regardless of the age or position of the mentors and mentee who will contribute towards realising 21<sup>st</sup> century developmental goals of our nation.

### 4. At least 50 hours of Continuous Professional Development (CPD) for every teacher in a year

- The Department of School Education, NCERT are working with State Governments and SCERT to design short-term modules for assisting teachers in *continuous professional development*.
  - NEP, 2020 envisages each teacher to undergo at least 50 hours of CPD per year.
- To realise the vision of NEP-2020, recently, NCERT under the aegis of the Ministry of Education (MoE), in collaboration with States/UTs and autonomous bodies have initiated the *NISHTHA (National Initiative for School Heads' and Teachers' Holistic Advancement) integrated training programme* 1.0, 2.0, and 3.0 online for different stages of school education-Teachers, Head Teachers/Principals, and other stakeholders in Educational Management and Administration.

## Conclusion

- The multipronged approach adopted by NEP, 2020 is likely to revitalise the teacher education, allow bright students to opt for ITEP as a matter of choice rather than by chance, and interventions like NPST, NMM, CPD, etc. contribute to qualitative changes in teachers' pedagogic transaction.
- Simultaneously, efforts will also have to be made to phase out the sub-par teacher training institutes and D. El. Ed courses.
- Dr APJ Abdul Kalam had said "Enlightened citizenship has three components: education with value system, religion transforming into spiritual force, and creating economic prosperity through development".
- We repose faith in our teachers to become torch-bearers for the young generation and shape India's development and sustained progress in the right direction.

## Skilling Youth for Future

### Introduction

- Vocational education in schools has been accorded high priority since *National Policy on Education, 1986*, and Centrally Sponsored Scheme (CSS) of *Vocationalization of Secondary Education* was launched in 1988.
  - Considering various bottlenecks in infrastructure, finance, and policy, the scheme was revised in 2011.
- The scheme was further revised in 2014 with the specific objectives of
  - integrating vocational education with general academic education;
  - enhancing the employability of youth;
  - filling the gap between educated and employable; and
  - decreasing the pressure on academic higher education.
- Currently, the scheme is being implemented as part of the *Centrally Sponsored Scheme 'Samagra Shiksha'* and has been aligned with the *National Skills Qualification Framework (NSQF)*.
- The vocational subjects are introduced as an additional subject at the Secondary level and as a compulsory elective subject at Senior Secondary level.
- The scheme covers Government schools and Government aided schools.

### Vocational Education in NEP, 2020

- As mentioned by the National Education Policy 2020, '*The aim of education will not only be cognitive development, but also building character and creating holistic and well-rounded individuals equipped with the key 21<sup>st</sup> century skills*'.
- Though skill education in schools is one of the means towards this aim, NEP also mentions various challenges faced in its manifestation like
  - perceived social status hierarchy associated with vocational education,
  - lack of vertical mobility pathways for its students of post 12<sup>th</sup> as well as lack of its integration with mainstream education at all levels.
- Hence, NEP has also set a goal that by 2025, at least 50% of learners through the school and higher education system, shall have exposure to vocational education, making them learn at least one vocation and expose them to several more by integrating vocational education into all schools and Higher Education Institutions (HEIs) in a phased manner over the next decade.
- NEP 2020 also encourages different models of Vocational Education in schools so that locally relevant skill education can be offered in appropriate manner.

### Efforts Made

1. **Child at the Core:** Any intervention of providing Vocational Education needs to keep the child at the Core and care about the outcomes that are being achieved for the child.
  - **Provisions of Vocational Education at Upper Primary level (Grade 6-8):** It aims to provide opportunities to the students to orient themselves with the skills required for the various occupations in a sector and to equip them to make informed choices while selecting their subjects in higher classes.
  - **Provisions of Vocational Education at Secondary level:** Provisions of Vocational Education at Secondary and Sr. Secondary level, NSQF compliant vocational courses are offered to the students along with other academic subjects.
2. **Adaptability:** Another important aspect about vocational education that NEP aims to address is integration of vocational education into all schools and Higher Education Institutions (HEIs) and this provides mobility between general and Vocational Education.
3. **Coverage and Convergence:** Under *Samagra Shiksha*, new schools are being approved every year for the implementation of Vocational Education, where schools are provided with infrastructure and resources for providing Vocational Education in school premises.
  - Covid-19 has forced implementers to look for agile solutions mostly enabled by the technology for various components of education including skill education.
4. **States' Capacities:** States and UTs are key partners in implementing Vocational Education in schools and appropriate adoption and implementation of national policies by the State/UT Governments is critical for reaching the goals set by National Education Policy.

## Significance

- With ever changing socio-economic conditions, Skill Education also needs to keep up the pace and keep it relevant for students, industry, as well as communities.
  - Skill courses, methodology, and assessments should remain effective for students' holistic growth as envisaged in NEP.
- **Vocational Education and Training (VET) or Skilling Programmes** will be successfully implemented if the supply of skilled manpower matches with the demand in the industry or the world of work.
  - Therefore, it is important to assess the emerging requirements for knowledge and skills and match them through the VET or Skill Programmes.
- The sectors which require a greater focus to meet the skill requirements of the future workforce are IT-ITeS, Renewable Energy/Green Energy, Power, Hospitality, Tourism, Electronics, Green Construction, Sustainable Mining, Green Logistics, Telecom, Green Agriculture, Disposable Plastics, and Chemicals.
- Emerging trends, such as Internet of Things (IoT), machine learning, Artificial Intelligence (AI), and robotic process automation need to be explored besides the 21st century skills.
- Digital skilling should become the core programme of all the skill development activities.

## Conclusion

- The education ecosystem needs to offer skill education in schools that touch various crucial aspects of holistic education and overcome the social status hierarchy associated with Vocational Education.
- India is on its way to implement the key reforms for integrating and mainstreaming of vocational education with general education.
- At the same time, the role of all stakeholders at all levels becomes really crucial for ensuring that children are provided with vocational and life skills required for the 21st century.

## Quality Education for all

### Introduction

- Quality education is a comprehensive term that includes learners, teachers, learning environment, appropriate curriculum, engaging pedagogy, learning outcomes, continuous formative assessment, and adequate student support.
- Quality is more a systemic trait rather than only a feature of instruction or attainment. It is not merely a measure of efficiency but also has a value dimension.
  - Another dimension of quality is to address the rural-urban divide and regional disparities as also the digital divide.
- Learning should be holistic, integrated, inclusive, enjoyable, and engaging.

### Background

- As Education is in the *concurrent list of the Constitution*, the Government of India through the erstwhile Centrally Sponsored Schemes of *Sarva Shiksha Abhiyan (SSA)*, *Rashtriya Madhyamik Shiksha Abhiyan (RMSA)*, and *Teacher Education (TE)* has been aiming to- enhance access, promote equity through the inclusion of disadvantaged groups and weaker sections, and improve the quality of education for all.
- The *Right of Children to Free and Compulsory Education Act (RTE), 2009* mandates good quality elementary education conforming to the standards and norms specified in the Act.
- The overarching 2030 Agenda for *Sustainable Development Goals for Education (SDG 4)* also commits to provide inclusive and equitable quality education at all levels.
  - It aims at ensuring access to and completion of quality education for all children.
  - This necessitates that at a minimum, all learners develop *Foundational Literacy and Numeracy (FLN) skills* as building blocks for further learning as well as higher order skills in order to lead to relevant, equitable, and effective learning outcomes at all levels and all settings.

### Challenges in the provision of quality of education for all

- a) persistent gaps in learning outcomes, including lack of clear definition and lack of understanding of the same among teachers and parents,
- b) children being unprepared for schooling,

- c) teachers lacking the skills and motivation to be effective, time spent on different activities in classroom transactions,
- d) ineffective school leadership.

### Recommendation of National Education Policy, 2020

- The policy stresses on the core principles that education must develop not only the cognitive skills- both 'foundational skills' of literacy and numeracy and 'higher-order' skills such as critical linking and problem solving, but also social and emotional skills-also referred to as 'soft skills', including cultural awareness empathy, perseverance and grit, teamwork, leadership, communication, etc.
- The new policy proposes revamping of all aspects of the education structure, its regulation and governance, to create a new system that is aligned with the aspirational goals of 21<sup>st</sup> century, while remaining consistent with India's traditions and value systems.
- **The major recommendations of National Education Policy 2020 for enhancing quality of school education are:**
  - a. **Transforming Curricular & Pedagogical Structure:** It recommends a new pedagogical and curricular structure of school education (5+3+3+4)-
    - **Foundational stage(5 years up to class II)** multilevel, play/activity-based learning;
    - **Preparatory Stage(3 years from class 3 to 5)** having play, discovery, activity-based, and interactive classroom learning;
    - **Middle Stage (3 years from class 6 to 8)** offering experiential learning in sciences, mathematics, arts, and social sciences, and Secondary Stage offering 4 years of multidisciplinary study, critical thinking, flexibility, and choice of subjects.
  - b. **Integration of Experiential Learning,** Play-based, Sports-integrated, art-integrated, storytelling, toy-based pedagogies at all the stages of school education.
  - c. **Integration of Pre-vocational education** into the curriculum from upper primary level onwards.
  - d. **Strengthening and universalisation of Early Childhood Care and Education (ECCE), and Foundational Literacy and Numeracy (FLN).**
  - e. **Development of National and State Curriculum Frameworks** for- ECCE, School Education, Teacher Education, and Adult Education, which will integrate key 21st century skills, mathematical thinking, and scientific temper.
  - f. **Reform in Assessment and Examination-** Creating Holistic Progress Card.
  - g. Enhancing quality of pre-service and in-service training of teachers.
  - h. Tracking Student Progress for Achieving Learning Outcomes.
  - i. **National Professional Standards for Teachers (NPST) and National Mission for Mentoring (NMM)** for teachers.

### Enhancing Quality of School Education through Samagra Shiksha Scheme

- The **Samagra Shiksha Scheme** was launched in 2018-19 as an overarching centrally sponsored scheme for school education that sees learning as a continuum from pre-primary to higher secondary with focus on contextual, experiential, and holistic learning.
  - It subsumed the three erstwhile Centrally Sponsored Schemes of SSA, RMSA and Teacher Education.
  - It has been formulated in accordance with the **Sustainable Development Goal for Education (SDG-4)** and in 2021-22, it has been aligned with recommendations of NEP 2020 to ensure inclusive and equitable quality education.

### Objectives of the Samagra Shiksha Scheme

- a. Support States and UTs in implementing the recommendations of NEP 2020 and RTE Act, 2009;
- b. Thrust on Holistic, Integrated, Inclusive, and activity-based Curriculum and Pedagogy to impart 21<sup>st</sup> century skills to students;
- c. Provision of quality education and enhancing learning outcomes of students;
- d. Bridging Social and Gender Gaps; ensuring equity and inclusion at all levels of school education;
- e. Strengthening and upgradation of State Councils for Educational Research and Training (SCERTs), and State/District Institutes of Education and Training (DIET) as nodal agency for teacher training;
- f. Ensuring safe, secure, and conducive learning environment and minimum standards in schooling provisions.

## Steps taken by Government to improve the quality of education

1. **The Central RTE Rules 2010:** They were amended on 20 February, 2017 to include reference on class-wise, subject-wise learning outcomes at the elementary level.
2. **The National Achievement Survey (NAS):** It is conducted periodically to enable a health check on the education system, identify gaps in learning outcomes, and take remedial steps.
  - This has helped instil the concept of competition among States on status of school education.
3. **Focus on teachers' training and capacity building: National Initiative for School Heads' and Teachers' Holistic Advancement (NISHTHA)** is a first of its kind teacher training programme under **Samagra Shiksha** wherein the Government of India, through its academic bodies, NCERT and NIEPA, is taking a lead role in changing the landscape of in-service teacher training.
4. **National Initiative for Proficiency in Reading with Understanding and Numeracy (NIPUN Bharat):** It has been launched on 5 July 2021, for ensuring that every child in the country attains **Foundational Literacy and Numeracy (FLN)** at Grade 3 by 2026-27.
5. **Digital Initiatives:** Given the importance of leveraging technology for enhancing teaching learning experiences as envisaged in **NEP 2020**, the Government accords high priority to provision of ICT labs and smart classrooms in schools at the upper primary to senior secondary level, which are supported under **Samagra Shiksha**.
6. **PM eVidya:** It is a comprehensive initiative under **Atmanirbhar Bharat Programme**, which unifies all efforts related to digital/online/on-air education to enable coherent multi-mode access to education.
7. **PM Poshan Shakti Nirman:** It is a right-based Centrally Sponsored Scheme under **National Food Security Act, 2013** and covers all children of Balvatika to Class VIII in Government and Government-Aided schools for provision of supplementary nutrition at school.
8. **Alternative Academic Calendar and Students' Learning Enhancement Guidelines :** NCERT has prepared 'Alternative Academic Calendar' and 'Students' Learning Enhancement Guidelines' to suggest models for the different scenarios of access to digital devices to ensure that no child is deprived of education.
9. **Home-based learning:** It is an alternative method in times of pandemic when schools remain closed.
10. **School preparation module :** NEP 2020 recommends the development of 3-month play-based 'school preparation module' for all Grade I Students' with and without preschool education, to ensure that all children are grade I ready till universal provisioning of quality preschool education is achieved.
  - Accordingly, NCERT has developed the **VIDYA PRAVESH module** that can be adapted or adopted by States and UTs as per their need.
11. **SAFAL (Structured Assessment for Analysing Learning levels):** This Competency-based assessment will be introduced in CBSE schools for grades 3, 5, and 8 as per NEP 2020, from 2021-22 academic session.
12. **Vidyanjali 2.0:** A volunteer management programme; it will help the community/volunteers to interact and connect directly with the Government and Government-aided schools of their choice and share their knowledge and skills and/or contribute in the form of assets/material/equipment to meet the requirement of these schools.
13. **School Quality Assessment and Accreditation (SQAA):** CBSE has been designated as **Standards Setting Authority (SSA)** for Kendriya Vidyalayas, Navodaya Vidyalayas, Private Independent Schools, and Government schools affiliated to the Board.
  - Accordingly, CBSE has prepared standards in different areas of school functioning like curriculum, pedagogy, assessment, infrastructure, inclusive practices, human resources, management and governance, and leadership.

## Areas of Focus

- a. **Curricular Material:** The quality dimension needs to be examined from the point of view of the experience designed for the child in terms of knowledge and skills.
- b. **Linkages across levels of school education:** Linkages between foundational, preparatory, middle and secondary levels in the processes of designing and preparing curricular material are vital.
- c. **Synergy:** Setting up of structures that enable school teachers and subject experts drawn from institutions of higher learning to work together for revision of curriculum and development of learning material.
- d. **Innovative pedagogy-** Every teacher needs to be given autonomy to choose the pedagogy relevant to her learners' needs to make education more experiential, holistic, integrated, inquiry-driven, discovery-oriented, learner-centred, discussion-based, flexible and, of course, enjoyable.
  - Moreover, learning outcomes need to be seen as an integral part of pedagogy.

- e. **Assessment-** The shift is towards Competency based learning i.e. children advance to the next level only upon mastering the current level of learning outcomes defined for each grade.
- f. **Capacity Building and Teacher Training-** NEP recommends that teachers be given continuous opportunities for self-improvement and to learn the latest innovations and advances in their profession.

## Conclusion

- The increased focus on improving overall quality of education by introducing new policy reforms like encouraging multilingualism, research, innovation, curriculum reforms technology-enabled teaching, innovative pedagogy, and providing prevocational skills depict the Government's commitment towards transformation of school education, bridging the learning gaps, and providing education to the last child in the last mile.

## Equitable and Inclusive Education

### Introduction

- For any accessible reading material, it is important that the content to be adapted is also inclusive.
  - The material must show diverse characters, and they must be relevant for children from different backgrounds.
  - When developing any teaching-learning material, we must think of all children, with variations in their ability, socio-economic backgrounds, interests, strengths, and access as being able to use it and find it relevant.

### Role of National Education Policy-2020

- The National Education Policy 2020 has clarified a move to prioritise "the inclusion and equal participation of children with disabilities in ECCE and the schooling system."
- Children with disabilities will be enabled to fully participate in the regular schooling process from the Foundational Stage to higher education."
- NEP is also affirming a commitment to actualising the provisions of *RPwD Act, 2016* on adapting the schooling system to the needs of children with disabilities so that children with and without disabilities learn together, and also the SDG 4 - To ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.


### Content for Children with Disabilities

- The Guidelines for the Development of e-content for Children with Disabilities is a timely intervention. They aim to promote the development of high-quality accessible content for children with disabilities and strengthen momentum for inclusive classrooms as envisioned in NEP 2020.
- They are framed on the basis of four cardinal principles, namely, that the e-content must be
  - a. **Perceivable**- students must be able to perceive content via any sense.
  - b. **Operable**- students must be able to manipulate and control the content.
  - c. **Understandable**- students should be able to comprehend the content and the operations such as the instructions.
  - d. **Robust**: which means that students should be able to access the content on a range of devices- a laptop, a desktop, a tablet, or a smartphone?

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## Barkhaa: Reading for 'All' Children

- The Barkhaa Reading series was developed originally by the Department of Elementary Education at the NCERT, and consisted of 40 slim storybooks in Hindi that featured a range of diverse young children in a variety of relatable yet interesting situations.
  - The features give a multi-sensory experience to readers - auditory and visual.

## Accessible Textbooks for 'All'

- NCERT's module 'Towards Accessible Textbooks for All' in collaboration with the National Institute of
- Special Education, the Republic of Korea, took forward the learning from the Barkhaa series to adapt nine stories and poems from NCERT textbooks of Class 1 to 5 into accessible digital formats (different types of audio tracks, videos which included sign language).

## Conclusion

- The attention and focus given by NEP on inclusion and equity in education is built on years of efforts and advocacy by State and national initiatives, and several other stakeholders in their respective capacities to build a better schooling system where children with disabilities can learn together with all children in an equitable manner.
- NEP is expected to bring together the initiatives under the umbrella of systemic support and therefore strengthen how inclusion and equity is planned, executed, and monitored.

## NIPUN Bharat Mission

### Introduction

- Foundational learning forms the cornerstone to successful academic development in later grades and is considered to be the gateway to Learning.
  - Moreover, there are several associated long-term benefits from investing in foundational learning, such as better life outcomes and higher economic growth.

### Indian Scenario

- India has a gigantic number of Anganwadi centres and almost 3.46 crore children of age group of 3 to 6 are enrolled in 13.87 lakh Anganwadis.
  - Further, India has progressed substantially towards achieving universalisation of elementary education; the gross enrolment ratio (GER) at the primary level is 102.7% (as per UDISE + 2019-20) which indicates that nearly all children at primary level are enrolled in schools.
- However, the status of foundational learning is not much different in India; learning levels have remained consistently low. As per the results of National Achievements survey conducted in 2017, almost 18% and 13 % children in language and numeracy in Class III are below basic level.

### NEP 2020 and NIPUN Bharat Mission

- With the revolutionary recommendations such as low stake board exams, thrust on formative assessments, experiential learning at all stages, innovative and activity-based pedagogies to promote critical thinking, creativity and curiosity amongst the children, and establishing crucial role of foundational learning, the National Education Policy envisions to transform the education system and make it compatible with the aspirations of the 21st century.
- One of the major recommendations of NEP 2020 is emphasis on universal acquisition of foundational skills by all children at the end of Grade III.
  - Foundational learning accounts for children's ability to read and meaningfully comprehend, as well as use basic mathematical operations in real life.

### NIPUN Bharat

- Department of School Education and Literacy has launched a National mission namely 'NIPUN Bharat' (National Initiative for Proficiency in Reading with Understanding and Numeracy)" on 5 July, 2021.

- The vision of the NIPUN Bharat Mission is to create an enabling environment to ensure universal acquisition of Foundational Literacy and Numeracy (FLN), so that every child achieves the desired learning competencies in reading, writing, and numeracy at the end of Grade III in next five years.
- The mission will cover the learning needs of children in the age group of 3 to 9 years.
- NIPUN Bharat Mission has been envisioned to make learning Holistic, Integrated, Inclusive, Enjoyable, and Engaging.
- Another distinctive feature of the NIPUN Bharat Mission is Lakshya Soochi or Targets for Foundational Literacy and Numeracy which has specifically been developed to generate greater awareness among the parents, community, volunteers, etc.

### Three Developmental Goals

- Developmental Goal 1: Children maintain good health and well-being
- Developmental Goal 2: Children become effective communicators
- Developmental Goal 3: Children become involved learners and connect with their immediate environment.

### VIDYA PRAVESH

- NCERT has developed Vidya Pravesh, a 3 Months Play Based 'School Preparation Module' as an integral part of the NIPUN Bharat mission that can be adapted or adopted by States and UTs as per their need for children entering Grade I.
  - The objectives of Vidya Pravesh is to provide age and developmentally appropriate early learning experiences to all children coming from diverse settings and to promote strong foundation for development and learning of all children with a focus on FLN.

### Assessment

- Assessment involves the gathering of information from all possible sources, regarding knowledge, skill, attitude, ability, and beliefs of the students, document the same, and use this data to make informed instructional decisions, refine or restructure processes, and ultimately improve the students' learning.
- The school-based assessment will help in monitoring the quality of education in a decentralised manner.

### Stakeholders' Participation

- NIPUN Bharat Mission cannot succeed without the participation of community including parents and volunteers.
- The involvement of parents and community is even more critical to provide extended academic support.

### Conclusion

- NIPUN Bharat mission promotes 21st century skills and replaces rote memorisation with critical thinking, scientific temper, and activity-based learning.
  - It realises that the primary aim of education is that the learner will acquire knowledge, understand what has been acquired and make informed decisions in the application of that knowledge to solve problems.
  - If the learner is unable to make connections between the content and their day-to-day life, the content loses meaning.
  - Schools should provide an environment where students can develop the ability to see relationships between subjects, content, and skills as well as between school and life outside of the classroom.

## Bridging Education and Communities

### Introduction

- Education has been the foundation of Indian society since the beginning of Civilization. Prior to colonisation, the Gurukul system was prevalent and worked on informal structures.
- This provided a greater scope for interaction with the society and the connect between knowledge and its application. During times of Nalanda and Takshashila, the history of higher education in India was more holistic and connected to the society.
- The current education system is rooted in the British education system which brought in a formal structure and contributed significantly to the growth of education in India.
  - Universities, colleges, and schools were structured and developed on these lines.

## Community Engagement in School Education

- **Community engagement** is an essential element which links education to the society.
- NEP articulates the role of community in education both explicitly and implicitly. It states that Anganwadis shall be fully integrated complexes/clusters, and children's parents and teachers will be invited to participate in school complex programmes.
- **The concept of cluster schools** brings in the role of community in building schools and enhancing learning.
- **Non-governmental philanthropic organisations** are encouraged to build and develop schools.
- The Policy recommends the participation of community, alumni, and volunteers in making learning more effective and in achieving Foundational Literacy and Numeracy (FLN) outcomes.

## Higher Education

- The major recommendation of NEP is to make higher education broad-based and holistic. Universities and colleges have to become multidisciplinary institutions of higher learning.
  - Multidisciplinary approach binds the courses to the needs of the society with flexible and innovative curriculum.
  - The **Choice Based Credit System (CBCS)** structure calls for varied combination of courses with integration of experiential learning.
- The **University Grants Commission (UGC)** has also developed the National Curricular Framework and guidelines, 2020 specifically on fostering community engagement in higher educational institutions (HEIs).
- The Ministry has also entrusted **Mahatma Gandhi National Council of Rural Education (MGNCRE)** with the task of preparing and running Massive Online Open Courses on SWAYAM platform on Fostering Social Responsibility and Community Engagement.

## Conclusion

- The ideology behind NEP is to bridge the divide between the society and education. Education is intended to be part of the society and society needs contribution of educational institutions to have a synergetic relationship.
- The challenge is how to go ahead with the implementation at individual schools and colleges with its true spirit and pro-activeness.
- Community engagement has to be institutionalized by incorporating the same in the vision, mission, objectives, and the institutional plans.
- Institutional mechanisms have to be developed to integrate community engagement with other areas of teaching-learning and research.
  - However, institutions are feeling the need to be hand-held during the implementation.

## Recruitment, Training, and Assessment of Teachers

### Introduction

- The education system aims to develop good human beings capable of rational thought and action, possessing compassion and empathy, courage and resilience, scientific temper, and creative imagination with sound ethical moorings and values. Its motive is to produce engaging and productive citizens who can contribute to building an equitable, inclusive, and plural society as envisaged by our constitution.
- National Education Policy 2020 stresses on the importance of the role of teachers, it states "**Teachers truly shape the future of our children - and, therefore, the future of our nation.**"

### Recruitment Process

- NEP 2020 recommends strengthening the TET in various ways and inclusion of evaluation of subject knowledge and teaching competencies through demonstrations and interviews.
  - These interviews would also assess comfort and proficiency of teaching in the local language.
- To deal with inadequate number of teachers, the policy promotes the idea of hiring local experts to a school complex and sharing them across the cluster of schools adopted by State or UT.
- The policy suggests incentives for teachers to take up teaching jobs in rural areas, by the provision of local housing near or on the school premises, or increased housing allowances.

## Training

- NEP states "Teachers will be given continuous opportunities for self-improvement and to learn the latest innovations and advances in their professions.
- These will be offered in multiple modes, including in the form of local, regional, state, national, and international workshops as well as online teacher development modules.
- Teachers shall be expected to participate in at least 50 hours of Continuous Professional Development (CPD) opportunities.

## Evaluation and Assessment

- Currently, there is a Confidential Report (CR) method used for the evaluation of teachers. This is not a performance and target-based method.
  - This system does not give weightage to evaluation of children's learning ability as a result and outcome of teacher's efforts.

## Way Forward

- There is a need for a system where increments are given based on the performance. Also there may be a provision of incentives.
  - This will help improve the performance. With these improved performances, desired results can be achieved.
- The NEP looks promising as it rightly highlights the changes necessary in the 21st century.

## Teach them Young

### Background

- NEP 2020 notes: "Over 85% of a child's cumulative brain development occurs prior to the age of 6 indicating the critical importance of appropriate care and stimulation of the brain in the early years.
- Neuroscience tells us that "a young child's brain develops through stimulation of the sensing pathways e.g. seeing, hearing, touching, smelling, tasting.
- Therefore, missing this critical window of opportunity would be to deprive the child an opportunity for learning and a better future.

### "It takes a village to raise a child"

- This adage is befitting of the early year children more than anyone else. They begin to form a sense of self but their agency is mediated by caring adults who surround them-family, teachers, anganwadi workers, etc., who would provide for their food, care, learning, and safety, and shape a sense of self.

### Indian Scenario

- Of the nearly 25 million children born in India every year, about 99% enroll in school at the age of 5 or 6. However, as ASER 2019: 'Early Years 'reveals, many enter school without being school-ready.
- NEP 2020 and NIPUN Bharat emphasize the need to involve parents/family in the learning.

### Technological Intervention

- Technology in the ECCE space is not child facing but can become a powerful tool to empower and enable caring adults (caregivers, teachers, anganwadi workers) to raise the quality of interactions with their children in the physical world.
- It can aid in the creation of more learning moments through providing relevant, usable information, and easing discovery of child resources.

### Language as a Resource

- NEP 2020 lays emphasis on "multilingualism and the power of language" arguing for a promotion of home, local, and regional languages.
- NEP 2020 argues for children to be exposed to multilingualism early on "as research clearly shows that children pick up languages extremely quickly between the ages of 2 and 8 and that multi-lingualism has great cognitive benefits to young students".

## Inclusivity

- NEP 2020 advocates inclusion of all Socio-Economically Disadvantaged Groups (SEDGs) at the three levels of access, participation, and learning outcomes.
  - NEP 2020 specifically calls out that "children who come from families that are economically disadvantaged" reap the "greatest dividends" with an early childhood education.
- It draws attention to:
  - a. Disparities experienced by socio-cultural groups based on caste, tribe, and religion.
  - b. Bridge the alienation children from tribal communities.
  - c. Specially targeting girls, who cut across all underrepresented groups.
  - d. Ensuring inclusion and equal participation of children with disabilities.
  - e. Support to teachers to sense & identify learning disabilities early and plan for their mitigation.

## Way Forward

- A strong investment in ECCE ensures the achievement of preschool level learning outcomes across key developmental goals.
  - a. Children maintain good health and wellbeing.
  - b. Children become effective communicators.
  - c. Children become involved learners and connect with their immediate environment.

## Music and its significance

### Introduction

- Music integrates varied subject simultaneously. Music education not only allows children to develop their musical aptitude, but it also gives them an opportunity to develop their mathematical skills- incorporate fractions, science skills, and gain knowledge of history.
- Additionally, it improves their grades, motor skills, and cognitive ability. Moreover, it enhances brain functions, increases the happiness index, leads to better emotional development, and lowers stress levels in children in the process.

### Discipline and Concentration

- Learning and practicing music develops time management skills and gives children a direction and focal point.
  - Inculcating these values early in life has innumerable benefits on a child's future.

### Brain Development

- Various studies have shown that learning and practicing music can lead to improved brain development of children.

### Indian Classical Music and Arts

- India has a rich cultural heritage with varied traditions of music and art forms all across the country.
- The responsibility of giving the right exposure to the children lies largely with parents and schools, and early exposure of classical music during their school years becomes helpful when a child is receptive and their sensitivities are developing.



## Music as an Established Subject

- Music should be encouraged and included in schools and colleges as a mainstream subject.
- The advantages of music are extensive and far-reaching and do not lead up to any child's race, ethnicity, or social background.
- Music education from a young age has proved to be a well-founded predictor of success in higher education and professional life as well.
- The great violin teacher Shinichi Suzuki once said "*The purpose of music education is to train children, not to necessarily be professional musicians but to be fine musicians and to show high ability in any other field they enter.*"

## Conclusion

- The benefits that music education offers are way beyond academic excellence and consist of no language barrier.
- Its applications in today's fast-moving world are truly inspiring and liberating. Hence, music education should not only be retained in schools and colleges but should be made mandatory and not kept optional anymore.

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# KURUKSHETRA

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APTI PLUS

# Ayushman Bharat: Achieving Universal Health Coverage

## Introduction

- As per the *World Health Organisation (WHO)*, *attaining the highest possible standard of health is a fundamental right* of every human being.
- The right to health has been central to WHO's identity and mandate since its inception.
- For achieving the targets of Universal Health Coverage, the Government of India has implemented a flagship public health scheme - '*Ayushman Bharat*'.
  - It is based on the recommendations of National Health Policy and was formulated and implemented in the country.
  - It is envisaged that this initiative will help India in achieving the Sustainable Development Goals (SDGs); its mandate being "*leave no one behind*".

## Objective

- Developed with the main objective of providing comprehensive need-based healthcare service delivery system under the Ministry of Health and Family Welfare, it has a budget of nearly Rs. 8,000 crore for the financial year 2021-2022.
  - It aims to holistically address the healthcare system-covering prevention, promotion and ambulatory care at all levels - primary, secondary and tertiary.
  - To enhance the quality, efficiency and efficacy of healthcare delivery, it draws expert services and facilities from various sectors/departments.

## Steps taken at global level

- At global level, the *Alma-Ata Declaration (1978)* had emerged as a major milestone in the field of public health.
  - It had identified primary health care as the key for attaining the goal of 'Health for All' by the year 2000AD.
- Thereafter, commitments set in the Millennium Declaration (September 2000) led to the formulation of *Millennium Development Goals (MDGs)* which comprised 8 goals with 21 targets and a series of measurable health and economic indicators for each target.
- In 2015, UN General Assembly launched the *Sustainable Development Goals (SDGs)* - a collection of 17 global goals with a total of 169 targets and a set of 232 indicators for measuring the progress.
  - Of these, the *SDG-3 addresses health directly* while the *SDG-2, SDG-6 and SDG-5 address health indirectly*.
- *Astana Declaration (2018)* has shifted the focus from Alma-Ata (primary health care) towards Universal Health Coverage (UHC) for attaining the sustainable development goals.

## Universal health coverage

- The concept of *Universal Health Coverage (UHC)* was first proposed by the *Bhore Committee* in 1946, highlighting that all individuals and communities should receive the health services they need without any economic stress.
  - The committee recommended integration of preventive and curative services at all levels and laid out a plan for strengthening the primary healthcare.
- According to the World Health organization (2021), *Universal Health Coverage* includes the full spectrum of essential quality health services - from health promotion to prevention, treatment, rehabilitation, and palliative care across the life span.
  - It aims at reducing morbidity and mortality by facilitating easy, economical and secure access to good quality health services to the masses.
- By facilitating economical access to health services, the nation can help in breaking the vicious cycle of morbidity and poverty, especially among the vulnerable resource-poor population groups.
  - It is aimed at supporting the economically weaker and deprived population groups who often have to sell their assets, take loans and/or compromise on their basic amenities in trying to meet the illness-linked medical expenses.
  - As a result, such population groups often remain away from being able to maintain good health and well-being.

## Focus Area and Framework

- **Universal Health Coverage (UHC)** should particularly focus on:
  - The proportion of population (among the general and the most disadvantaged groups) that can access essential quality health services (SDG 3.8.1)
  - The proportion of population that spends a large amount of household income on health (SDG 3.8.2).
- To meet the SDGs targets, nations across the globe are trying to achieve UHC with a focus on its three major pillars: **Service Delivery, Health Financing and Governance**
- a. **Finance**
  - Expand financial pool by promoting public-private partnerships and corporate-social responsibility.
  - Increase domestic resource mobilisation budget re-allocation at frequent intervals
  - Enhance affordability of health services, infrastructure, medicines aid related items
  - Provide financial protection to each citizen if the country
  - Facilitate efficient anti judicious time-bound utilisation of financial resources.
- b. **Health Services**
  - Establish people-centric health services Ensure equity and bias-free health service
  - Prioritise health services which are of most significance to reducing mortality and morbidity
  - Promote partnerships between the civil society (community) with public/private sector so as to enhance access to key preventive, rehabilitative and curative health services
  - Invest in pre-service medical and paramedical education
  - Engage in multi-sectoral partnerships to address determinants of health.
- c. **Equity**
  - Target vulnerable populations so to develop and implement health/nutrition programs tailored to their needs
  - Expand service delivery for marginalised and vulnerable groups (age, gender, demography, etc.)
  - Ensure fulfilment of basic rights especially of women, children and elderly.
- d. **Preparedness**
  - Prepare and regularly improve National preparedness plans especially for natural disasters and Promote adherence to the International Health Regulations
- e. **Governance:**
  - Establish transparent monitoring and reporting on progress towards UHC and make it available on public domains
  - Strengthen national institutions and organisations through capacity building
  - Ensure that all citizens have access to data and information on UHC.

### Universal Health Coverage - Indicators for tracking the progress

- The World Health Organisation and World Bank have provided indicators which can help in measuring as well as keeping a track on the progress over time.
- They have given 16 essential health services as the indicators of level and equity of coverage in the country.
- a. **Reproductive, maternal, new-born and child health**
  1. family planning
  2. antenatal and delivery care
  3. full child immunization
  4. health-seeking behaviour for pneumonia.
- b. **Infectious diseases**
  5. Tuberculosis treatment
  6. HIV antiretroviral treatment
  7. Use of insecticide-treated bed nets for malaria prevention
  8. Adequate sanitation.
- c. **Non-communicable diseases**
  9. Prevention and treatment of raised blood pressure
  10. Prevention and treatment of raised blood glucose
  11. Cervical cancer screening
  12. Tobacco (non-) smoking
- d. **Service capacity and access**
  13. Basic hospital access
  14. Health worker density
  15. Access to essential medicines

16. Health security: compliance with the International Health Regulations.

### Ayushman Bharat for Universal Health Coverage

Ayushman Bharat has two major components namely -

1. **Health and Wellness Centres (HWCs):** It is envisaged that 1,50,000 Health and Wellness Centres (HWCs) would be created under Ayushman Bharat which would also involve the transformation of existing Sub-centres and the Primary Health Centres (PHCs).
  - The major objective of HWCs would be to provide Comprehensive Primary Health Care (CPHC) closer to the residence/vicinity of the people.
  - These centres would particularly aim at providing maternal and child health services along with delivery of health services for major non-communicable diseases. In addition, these centres will also provide free essential drugs and diagnostic services.
2. **Pradhan Mantri Jan Arogya Yojana (PM-JAY):** Launched in 2018, it is the largest government funded health assurance scheme in the world.
  - It aims at providing a health cover of Rs.5 lakhs per family per year for secondary and tertiary care hospitalisation to over 10.74 crore poor and vulnerable families from the bottom 40 percent of the Indian population.
  - The inclusion of households, both from the rural and urban areas, is based on the deprivation and occupational criteria of *Socio-Economic Caste Census-2011 (SECC2011)*.
  - It would provide cover to the beneficiaries earlier covered under *Rashtriya Swasthya Bima Yojana* but currently not included in the SECC2011 database.
  - It also provides support to the beneficiaries of *Employees State Insurance Corporation (ESIC/ESI)*.

#### PMJAY Features

- a. The annual benefits of Rs. 5 Lakh can be used by anyone or more members of the family covering up to all the members. There is no capping on family size or age of the family members.
- b. The eligible individuals, suffering from any medical condition even before enrolling under the PM-JAY, will be able to get treatment.
- c. It provides cashless access to healthcare services for the beneficiary at the point of service.
- d. It covers up to 3 days of pre-hospitalisation and 15 days post-hospitalisation expenses incurred on diagnostics and medicines.
- e. Benefits of the scheme are portable across the country.
- f. Public hospitals are reimbursed for the healthcare services at par with the private hospitals.

### Conclusion

- Since its inception, Ayushman Bharat has been trying to successfully meet its objectives of ensuring comprehensive coverage for catastrophic illnesses, reduce catastrophic out-of-pocket expenditure, improved access to hospitalisation/health-care, reduce unmet needs, and converging various health insurance schemes across the different states of India.

## Fighting Against COVID-19

### Introduction

- The global COVID-19 crisis disrupted lives, livelihoods, and economies everywhere. Its infectious spread has affected people from all walks of life in all countries.
  - It has left countries gasping in search of immediate solutions, even as the best scientists and researchers in the area of health and biotechnology in the world are diligently looking for a solution or a vaccine to end this crisis.
- A crisis of this magnitude spreading rapidly requires urgent, preventive, and curative solutions in several categories-these ranges from high-quality reliable masks, PPE, disinfectants, contact tracking, etc.

### India's Stand

- In 2019, Indian Government announced an economic stimulus package of Rs. 20 lakh crores to support economic activity in the production sector in a bid to ensure the supply of medicines and daily necessities.
- India has prioritised fostering innovation and encouraging technology development by engaging research and development institutes, academia, industries, start-ups and even individual innovators.
- By 2030, India aims to become one of the largest economies, by focusing on the innovation ecosystem in the country.
- With a vision to establish India as a global hub for start-ups on the world map, *Atal Innovation Mission* since its inception is working to become a powerhouse of innovation and entrepreneurship.
  - Many Private entities has come forward and making their contributions.

## Conclusion

- It is encouraging to find new Indian companies responsive to the special needs of COVID-19.
- The crisis has brought industry, academia, start-ups collaborating together in a manner not seen before, which augurs tremendously well for the future.
- It is time for Indian start-ups to rise up to the challenge and guide us to overcome the COVID-19 crisis with innovative entrepreneurial thinking.

## Yoga for Good Health

### Introduction

- Recognising the global appeal of Yoga, the United Nations on December 11, 2014 by resolution 69/131 proclaimed *June 21 as International Yoga Day*.
  - June 21 has special significance in many parts of the world. It is the Summer Solstice and is the longest day of the year in the Northern Hemisphere.
- International Yoga Day aims to raise awareness worldwide of the many benefits of practicing yoga.
  - The day is observed every year by 190 countries.

### Background

- The practice of Yoga is believed to have started with the very dawn of civilisation. It was revealed by *Patanjali, a great Indian sage*, over 2000 years ago in the classic text known as *Yoga Sutras*.
  - Patanjali defined Yoga as "the cessation of the movements of consciousness."
  - Yoga originated in ancient India. The late B.K.S. Iyengar defined Yoga as 'meditation in action'. He started Yoga after suffering various diseases in his childhood.

### Practice of Yoga in India

- India is blessed to have had many inspiring Yoga Gurus including Tirumalai Krishnamacharya, Swami Sivananda Saraswati, Swami Kavalayananda, Paramahansa Yogananda, Maharishi Mahesh Yogi, Swami Rama, Krishna Pattabhi Jois, Sadhguru Jaggi Vasudev, Sri Ravi Shankar.
  - All Yoga Gurus have played a meaningful role in keeping the tradition of Yoga alive.

### Role of Yoga in Pandemic

- From the time the pandemic began, the community of Yoga practitioners has grown manifold.
  - Many people took to Yoga during the pandemic to deal effectively with respiratory problems, obesity, stress, anxiety and overcome depression which were common problems during lockdown.
  - As India is now facing the third wave of the pandemic, the relevance of Yoga has increased even more as it is known to boost immunity.

### Global Surya Namaskar Programme

- The Surya Namaskar or sun salutation is a set of 12 asanas performed with coordination of the body and mind.
  - More than one crore people around the world took part in the Global Surya Namaskar programme on Makar Sankranti on January 14.
- The Ministry of AYUSH launched 75 crore Surya Namaskar Initiative. Launched in line with the commemoration of 75 years of India's independence, the 75 crore Surya Namaskar challenge also aims at creating the largest congregational Surya Namaskar event.

- The project will last till February 20, 2022.
- As many as 30 states are participating in the grand Surya Namaskar initiative.
- In 2021, the *theme of International Yoga Day was "Yoga for Wellness"*.

## Benefits of Yoga

- Yoga and relaxation have been successfully used to check high blood pressure and coronary artery disease.
  - Asanas like Vrikshasana, Tadasana, Vajrasana, Shashankasana, Shavasana, Uttan padasana, Makarasana coupled with pranayama like anulomvilom, on a regular basis, helps to flush out all the negative thoughts and mental fatigue.
- A study conducted by doctors of AIIMS in 2020 found that yoga can reduce not just migraine but even lower treatment cost of the disease.
  - The study, 'Effect of Yoga as Add-on Therapy in Migraine', was published in the online issue of Neurology, the medical journal of the American Academy of Neurology.
- Yoga can also contribute to treatment of epilepsy.
- Peptic ulcer can be efficiently managed with naturopathy and Yoga, without any side-effects.
- Performing asanas can help in improving blood circulation to the digestive organs, which leads to the increase in the recovery.
- Pranayamas like Nadhishuddhi pranayama (alternate nostril breathing), Shitali, Shitakari (cooling pranayamas) can help to reduce the abdominal burning sensation, pain and enhance the recovery by relieving acute and chronic stress.
- Regular yoga practice help people of all ages prevent and control non-communicable diseases (NCDs), which kill 41 million people globally every year, more than a third of them prematurely.
  - The four major NCDs- cardiovascular diseases, cancer, chronic respiratory diseases and diabetes- account for more than 80 percent of all premature NCD deaths, of which 85 percent occur in low- and middle-income countries.

## Name of Asanas, pranayams for different health problems

- **Thyroid**- Kapalbhati, Sarvaangasan, Ujjai Pranayam and Bhujangasan.
- **Diabetes**- Mandook Aasan, Shashakasan, Yogmudrasan, gomukhasan, anulomvilom, kapalbhati
- **Women with gynaecological problems**- Shashakasan, Kandrasan, Naukasan, Dhanurasan, Kapalbhati, anulom vilom, Bhastrika.
- **Patients with back ache**- Markatasan and Bhujangasan.
- **Patients with vision related problems**- Tratak.
- **Surya Namaskar** is beneficial for everybody.
- **Taar Aasan** is recommended to children for increasing height and **Vrikshasana** is for strengthening mental balance, improving neuromuscular coordination, alertness and concentration and strengthening legs and helping those who suffer sciatica (nerve pain in the leg).
- Yoga experts recommend that the concept of **yogic diet-'Ahara'** should be therefore merged well with the current set of practices.

## Initiatives of AYUSH Ministry

- It has launched the '**Namaste Yoga' App** to help people find Yoga teachers.
  - The App is an information platform for those looking for Yoga centres, events and trainers.
  - The App provides a platform for Yoga centres and trainers to promote themselves.
  - Certified trainers can register themselves and their business address on the App that is geo tagged to the location.
  - This enables people to find yoga centres or classes in their neighbourhood.
- Last September, the Union Minister of AYUSH, launched the '**Yoga break' App**, a mobile app to enable professionals de-stress at workplace.

## National Family Health Survey-5

### Introduction

- **National Family Health Survey-5 (NFHS-5)** provides data on a range of indicators pertaining to health and nutrition, among others, from over 6 lakh sample households.

- The data is disaggregated to the level of districts to enable identification of areas where progress has been made as well provide direction for future policy action.
- Availability of disaggregated data on a regular basis can enable the development of specific plans for district that have a disproportionate burden of diseases.

### Findings of NFHS-5

- The **Total Fertility Rates (TFR)**, an average number of children per women has further declined from 2.2 to 2.0 at the national level and all 14 States/UT's ranging from 1.4 in Chandigarh to 2.4 in Uttar Pradesh.
  - All Phase-II States have achieved **replacement level of fertility** (2.1) except Madhya Pradesh, Rajasthan, Jharkhand and Uttar Pradesh.
  - Replacement fertility levels have been achieved in 19 out of 22 States and UTs, with only Manipur (2.2), Meghalaya (2.9) and Bihar (3.0) having a TFR above replacement levels.
- **Contraceptive Prevalence Rate (CPR)** has increased substantially from 54 percent to 67 percent at all-India level and in almost all Phase-II States/UTs with an exception of Punjab.
  - Use of modern methods of contraceptives has also increased in almost all States/UTs.
- **Unmet needs of family Planning** have witnessed a significant decline from 13 percent to 9 percent at all-India level and in most of the Phase-II States/UTs.
  - The unmet need for spacing which remained a major issue in India in the past has come down to less than 10 percent in all the States except Jharkhand (12 percent), Arunachal Pradesh (13 percent) and Uttar Pradesh (13 percent).
- **Full immunisation drive among children** aged 12-23 months has recorded substantial improvement from 62 percent to 76 percent at all-India level.
  - Eleven out of fourteen States/UTs has more than three-fourth of children aged 12-23 months with fully immunization and it is highest (90 percent) for Odisha.
- There is an increase from 51 percent to 58 percent of women receiving the recommended four or more **Antenatal Care visits (ANC)** by health providers at all-India Level.
  - Also, all the Phase-II States/UTs have shown improvement except Punjab between 2015-16 to 2019-20.
- **Institutional births** have increased substantially from 79 percent to 89 percent at all-India Level.
  - Institutional delivery is 100 percent in Puducherry and Tamil Nadu and more than 90 percent in 7 States/UTs out of 12 Phase-II States/UTs.
  - Along with an increase in institutional births, there has also been a substantial increase in C-section deliveries in many States/UTs especially in private health facilities.
- **Child Nutrition** indicators show a slight improvement at all-India level as Stunting has declined from 38 percent to 36 per cent, wasting from 21 percent to 19 percent and underweight from 36 per cent to 32 percent at all India level.
  - In all phase-II States/UTs situation has improved in respect of child nutrition but the change is not significant as drastic changes in respect of these indicators are unlikely in short span period.
- **Anaemia** among children and women continues to be a cause of concern.
- **Exclusive breastfeeding** to children under age 6 months has shown an improvement in all-India level from 55 percent in 2015-16 to 64 per cent in 2019-21.
  - All the phase-II States/UTs are also showing a considerable progress.
- **Women empowerment** indicators portray considerable improvement at all India level and across all the phase-II States/UTs.
  - Significant progress has been recorded between NFHS-4 and NFHS-5 in regard to women operating bank accounts from 53 percent to 79 percent at all-India level.
  - For instance, in the case of Madhya Pradesh the increase was to the tune of 37 percentage point from 37 percent to 75 percent.
  - More than 70 percent of women in every state and UTs in the second phase have operational bank accounts.
- The NFHS-5 results have also highlighted some important public health concerns including high blood glucose levels, hypertension, obesity and tobacco use.
  - It is estimated that nearly a fourth of all men and women are overweight or obese ( $BMI > 25.0 \text{ kg/m}^2$ ).
  - Additionally, 38 percent of men in the Survey have been reported to be using some kind of tobacco.
  - Data illustrates that men are likely to have slightly higher blood glucose levels and hypertension, compared to women.

## Household Air Pollution-A Case Study

- The presence of *co-morbidities* is correlated with an increased need for hospitalisation, medical complications as well as higher risk of mortality.
  - The World Health Organisation (WHO) identifies *Chronic Respiratory Diseases* and *Ischaemic Heart Diseases* as co-morbid conditions that can worsen the impact of COVID.
- It is estimated that there are more than 300 million cases of *chronic obstructive pulmonary disease (COPD)* in the community worldwide that are more vulnerable to not only catching the infection but also developing a more severe form of COVID-19.
- Extensive research has shown that *household air pollution* from the widespread use of inefficient cooking fuels produces a range of health-damaging pollutants and is a major contributor to COPD and ischaemic heart diseases.
- Globally, 3.8 million deaths every year can be attributed to household air pollution.
  - Data from the Global Burden of Disease Study, 2019 published in the Lancet, suggests that 37 percent of 1.67 million deaths in India in 2019 due to air pollution were attributable to household air pollution.

## Steps taken by Government

- In 2016, the *Pradhan Mantri Ujjwala Yojana (PMUY)* was launched to provide LPG connections to the entire nation by 2019.
  - The scheme also complemented the *Prime Minister's 'Give It Up' campaign* which encourages voluntary surrender of the cooking gas subsidy by those who can afford to pay the market price for LPG.
  - The outcomes of the scheme which include promoting regular use of clean fuel for cooking, reduction in household pollution and ultimately a reduction in the incidence of respiratory diseases.

## Data Highlights

- States like Delhi, Goa, Chandigarh, Puducherry and Telangana have more than 90 percent of households using clean cooking fuel.
  - However, 14 States/UTs have less than 50 percent of the households using clean fuel for cooking including Jharkhand (31.9 Percent), Chhattisgarh (33 Percent), Meghalaya (33.7 Percent), Odisha (34.7 Percent), Bihar (37.8 Percent), Madhya Pradesh (40.1 Percent), West Bengal (40.2 Percent), Rajasthan, Assam, Nagaland, Tripura, Uttar Pradesh (49.5 Percent).
- At the district-level, NFHS-5 results indicate that **12 from Karnataka** and **10 from Maharashtra** are among the **top 30 performing districts** in the country which have made the highest delta progress in NFHS-5 compared to the previous Survey.
- Among the **30 least performing districts**, **7 are from Nagaland**, **4 are from Jammu & Kashmir** and **5 are from West Bengal**.

## Conclusion

- While access to clean cooking fuels is critical, consistent usage is imperative for addressing household pollution and decreasing the associated disease burden.
- Scaling up LPG through PMUY can be complemented with strategies for enhancing awareness about the health impact of traditional biomass chulhas, deploying Agri-and forest-based biomass in a clean and efficient manner, focusing on aspects of kitchen design and ventilation, streamlining subsidies for cooking energy with better targeting of consumers and leveraging alternate financing solutions.
- Analysis of district-level data from NFHS can pave the way for the development of targeted strategies for further increasing the coverage of clean cooking across the country.
  - The implementation of such interventions, in turn, will have a significant impact on checking household air pollution and minimising morbidity as well as mortality due to household air pollution linked diseases.

## Rural Healthcare Infrastructure

### Introduction

- The health of its citizens has been of paramount importance for every nation since the COVID-19 pandemic struck the world two years back.

- Assessment of healthcare facilities, upgradation of hospitals, modernisation of diagnostic facilities, increased availability and accessibility to medicines and medical equipment and rapid on-the-go skilling of health workers have been the pillars on which the fight against the pandemic rests.
- However, the state of healthcare infrastructure differs from country to country, and between urban centres and rural areas with each country, and this is true for India too.

## Initiatives Taken

### National Rural Health Mission

- The healthcare facilities in rural areas under the *National Rural Health Mission* (as part of the National Health Mission) have been developed as a three-tier system-
  1. Sub-Centres,
  2. Primary Health Centres (PHC),
  3. Community Health Centres (CHC).

### Ayushman Bharat

- Under *Ayushman Bharat*, the existing Sub-health Centres (SHCs) and Primary Health Centres (PHCs) are being transformed into AB-HWCs to deliver 12 packages of *Comprehensive Primary Health Care (CPHC)* that includes preventive, promotive, curative, palliative and rehabilitative services which is universal, free and close to the community.
  - As part of Ayushman Bharat, the government is supporting the States for transformation of Sub Health Centres and Primary Health Centres into Health and Wellness Centres across the country for provision of Comprehensive Primary Health Care (CPHC) that includes preventive healthcare and health promotion at the community level with continuum of care approach.
- Under this programme, CPHC services of an expanded range of services that are universal and free to users, with a focus on well ness, are provided to the community.

### Ayushman Bharat- Pradhan Mantri Jan Arogya Yojana

- *AB-PMJAY* provides health coverage up to Rs. 5 lakh per family per year to around 10.74 crore poor and vulnerable families as per Socio Economic Caste Census (SECC).

### Pradhan Mantri-Ayushman Bharat Health Infrastructure Mission

- *PM-ABHIM*, with an outlay of Rs. 64,180 crore till 2025-26 envisaged increased investments in public health and other health reforms to provide better access to health in rural areas by:
  - Strengthening of Health and Wellness Centres in villages and cities for early detection of diseases.
  - Addition of new critical care-related beds at district level hospitals.
  - Supporting Block Public Health Units (BPHU) in 11 high focus states.
  - Integrating district public health laboratories in all districts.

### National Health Mission

- NHM support is provided to the States for ensuring a range of free services related to maternal health, child health, adolescent health, family planning, universal immunisation programme, and for major diseases such as Tuberculosis, vector borne diseases such as Malaria, Dengue and Kala Azar, Leprosy, etc.

#### **Major initiatives supported under NHM include:**

- a. *Janani Shishu Suraksha Karyakram (JSSK)*: under which free drugs, free diagnostics, free blood and diet, free transport from home to institution, between facilities in case of a referral and drop back home is provided to pregnant women,
- b. *Rashtriya Bal Swasthya Karyakram (RBSK)*: It provides newborn and child health screening and early interventions services free of cost for birth defects, diseases, deficiencies and developmental delays to improve the quality of survival,
- c. Implementation of Free Drugs and Free Diagnostics Service Initiatives,
- d. *PM National Dialysis Programme* and implementation of *National Quality Assurance Framework* in all public health facilities including in rural areas.
- e. Implementation of *Mobile Medical Units (MMUs)* and *Tele-consultation services* to improve access to healthcare, particularly in rural areas.

### Certain new initiatives have been undertaken like

- a) The Screening for Non-communicable Diseases (NCDs),
- b) **Mothers Absolute Affection**: to promote exclusive breast feeding,
- c) **Pradhan Mantri Shurakshit Matratva Abhiyan**: to improve access to specialist maternal care through voluntary participation of private providers,
- d) **Pradhan Mantri National Dialysis Program**,
- e) **Ayushman Bharat programme**: It include Health and Wellness Centres (HWC) and Pradhan Mantri Jan Arogya Yojana (PMJAY),
- f) **Mission Indradhanush**: to immunise partially o uncovered population,
- g) **Rashtriya Swasthya Bal Karyakram (RBSK)**,
- h) **Kayalkalp**: to promote cleanliness, hygiene and infection control practices in public healthcare facilities),
- i) **Labour room quality improvement initiative-LaQshya**: Initiative to reduce preventable maternal and new-born mortality, morbidity and still births associated with the care around delivery in Labour room and Maternity OT and ensure respectful maternity care,
- j) **Surakshit Matritva Aashwasan (SUMAN)**: to end all preventable maternal and neonatal deaths, etc.

### Steps Taken

- Given the continuing gap in health personnel required in rural areas, the governments at the Centre and individual States have been trying to incentivise rural postings.
  - Financial support is provided to States for providing hard area allowance, performance-based incentives, providing accommodation and transport facilities in rural and remote areas including tribal areas, sponsoring training programmes, etc. to address the issue of shortage of doctors and specialists in the public health facilities.
- States/UT are also encouraged to adopt flexible norms for engaging healthcare workers for public health facilities by various mechanisms like 'contracting in' and 'contracting out' of specialist services under NHM.
  - States/UTs have also been allowed to offer negotiable salaries to attract specialists including flexibility in strategies such as "You quote, we pay".

### ASHA Workers: The Crucial Link in the Rural Healthcare System

- The ASHA worker acts as the interface between the community and the public health system in rural India, and is empowered with knowledge and a drug-kit to deliver first-contact healthcare, ASHA workers are the fountainhead of community participation in public health programmes in villages.
  - As community health volunteers, ASHA workers receive a fixed monthly incentive of Rs. 2,000 per month for undertaking routine and recurring activities.
  - However, in view of their significant contribution towards COVID-19 pandemic related work, States are paying an additional incentive of Rs. 1,000 per month for those ASHAs engaged in COVID-19 related work using the resources of *COVID-19 Health System Preparedness and Emergency Response Package*.
- Under the *Pradhan Mantri Garib Kalyan Package*, an insurance scheme has been introduced for all health workers, including ASHAs.
  - This insurance scheme provides an insurance cover of Rs. 50 lakh in case of loss of life on account of COVID-19 related duty.
- After the launch of the *Ayushman Bharat scheme* with operationalisation of *Ayushman Bharat-Health and Wellness Centres (AB-H WCs)*, ASHAs are now additionally eligible for Team Based Incentives (TBIs) along with Auxiliary Nurse Midwives based on monitored performance indicators (up to Rs. 1000 per month).
- In the year 2018, the ASHA benefit package was introduced acknowledging significant contribution and commitment of ASHAs.

### The package providing coverage for:

- *Pradhan Mantri Jeevan Jyoti Beema Yojana (PMJJBY)* with a benefit Rs. 2 lakh in case of death of the insured (annual premium of Rs. 330 contributed by Government of India).
- *Pradhan Mantri Suraksha Beema Yojana (PMSBY)* with a benefit of Rs. 2 lakh for accidental death or permanent disability, Rs.1 lakh for partial disability (annual premium of Rs. 12 contributed by Government of India).
- *Pradhan Mantri Shram Yogi Maan-dhan (PM-SYM)* with pension benefit of Rs. 3000 per month after age of 60 years (50 percent contribution of premium by Government of India and 50 percent by beneficiaries).

- A cash award of Rs. 20,000 and a citation is given to ASHAs who leave the programme after working for minimum of 10 years, as acknowledgement of their contribution.

### Strengthening Rural Infrastructure during COVID-19 Pandemic

- The Government of India has been providing support to States/UTs under the '*India COVID-19 Emergency Response and Health System Preparedness Package*' for the containment and management of pandemic, including for augmentation of infrastructure, oxygen supported beds, isolation beds, ICUs and Human Resources, supply of drugs, etc.
  - During the financial year 2020-21, Rs. 8147.28 crore has been released to States till the month of July under this package.
  - Rs. 110.60 crore has been made available for Insurance of healthcare workers.
  - Thus, a total amount of Rs. 8257.88 crore has been provisioned for the States/UTs.
- The '*India COVID-19 Emergency Response and Health Systems Preparedness Package -Phase-II*' (ECRP-Phase-II) amounting to Rs. 23,123 crore is under implementation from July 1, 2021 to March 31, 2022.
  - It aims to prevent, detect and respond to the continuing threat posed by COVID-19 and strengthen national health systems for preparedness in India.

### Conclusion

- In the 15 years of implementation, the National Health Mission has enabled achievement of the Millennium Development Goals (MDGs) for health.
- It has also led to significant improvements in maternal, new-born, and child health indicators, particularly for maternal mortality ratio, infant and under five mortality rates, wherein the rates of decline in India are much higher than the global averages and these declines have accelerated during the period of implementation of NHM.

## Maternal and Child Health

### Introduction

- Maternal malnutrition, because of its negative repercussions for both women and their children, poor maternal nutrition during and throughout pregnancy, is a major public health concern.
  - It is a global problem, with 24 percent of mothers in South Asia having a low BMI.
  - Furthermore, anaemia affects 30 percent of reproductive-age women and 37 percent of pregnant women.
  - Women's overweight/obesity is a growing problem in most low-middle-income nations.
- According to *National Nutrition Monitoring Bureau (NNMB)* survey in 10 Indian states, cereals and millets make up the majority of rural diets, with only approximately half of pregnant women getting enough protein and calories.
  - The NNMB also revealed that most pregnant women's iron, vitamin A and C, and folic acid consumption were less than half of what was advised.

### Maternal malnutrition in India

- According to the *Global Burden of Disease Study (2017)* Poor maternal nutrition in India is caused by a combination of variables such as
  - early and repeated pregnancies,
  - poverty,
  - caste discrimination,
  - gender inequality.
- The World Health Organization (WHO) recommends 49 interventions for Antenatal care (ANC), 14 of which are dietary interventions.
  - India's national standards are based on global recommendations for key nutrition treatments for pregnant women, including better diets.
- *POSHAN Abhiyaan* - India's flagship National Nutrition Mission- aims to enhance maternal nutrition by employing technology, behaviour communication, community engagement, and cross-sectoral convergence.
- In India, schemes for maternal and child health are mostly implemented through the flagship programmes of two ministries:

1. The *Ministry of Women and Child Development's* Integrated Child Development Services (ICDS) programme provides micronutrient-fortified supplementary food and/or energy-dense take-home meals for pregnant women and mothers who are breast-feeding.
2. The *Ministry of Health and Family Welfare* provides micronutrient supplements (IFA and Calcium), deworming tablets, weight gain monitoring, and nutrition advice to pregnant women as part of their antenatal care.

## Initiatives

### 1. The Integrated Child Development Services (ICDS)

- ICDS scheme is one of a number of programs being implemented by the Government of India to enhance the nutritional status of children in the country.
  - The programme is aimed towards children under the age of six, as well as pregnant and breastfeeding women.
  - *Take-Home Rations (THR)* comprising micronutrient fortified blended food and/ or energy dense food are supplied to children aged 0-6 years as well as pregnant and lactating women for consumption at home under the scheme.
  - Recommendations for energy, protein, and micronutrient requirements under ICDS, *Supplementary Nutrition Programme (SNP)* have been developed as per *ICMR's Recommended Dietary Allowance (RDA)*.

### 2. Pradhan Mantri Matru Vandana Yojana (PMMVY)

- As a part of the *National Food Security Act of 2013*, the Maternity Benefit Program has been implemented in all regions of the country starting January 1, 2017 titled as *Pradhan Mantri Matru Vandana Yojana (PMMVY)*.
  - This scheme is covered under the ICDS umbrella.

#### Features of PMMVY

- a. The beneficiary can only apply for the plan if the scheme eligibility standards are met within 730 days of the recipient's last menstrual period (LMP).
- b. After institutional delivery, the eligible beneficiaries would receive the remaining cash incentive as per approved norms towards the Maternity Benefit under *Janani Suraksha Yojana (JSY)* by the Health Department on an annual basis.
  - *Pregnant Women and Lactating Mothers (PW&LM)* shall receive a cash benefit of Rs. 5,000 in three instalments.

### 3. Janani Suraksha Yojana (JSY)

- The *National Rural Health Mission's Janani Suraksha Yojana (JSY)* is a safe motherhood intervention.
- In April 2005, the Janani Suraksha Yojana was started by amending the *National Maternity Benefit Scheme (NMBS)*.
  - Pregnant women who have reached the age of 19 and live in BPL households were eligible for financial support of Rs. 500 per birth up to two live births under the NMBS.
  - JSY aims to reduce maternal and infant mortality by promoting institutional delivery among pregnant women.
  - The programme also offers performance-based incentives to *ASHA (Accredited Social Health Activist)* who promote institutional delivery among pregnant women.

### 4. Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA)-Janani-Shishu Suraksha Karyakaram (JSSK)

- JSSK was established with the goal of eliminating out-of-pocket payments for pregnant women and unwell newborns seeking treatment at a public health facility and was launched in June 2011.
- Pregnant women in their second and third trimesters are provided with a minimum package of antenatal care services at Government health facilities (PHCs/CHCs, DHs/urban health facilities, etc.) in both urban and rural areas as part of the campaign.
- A mobile/ web-based application has been designed to help pregnant women find their nearest PMSMA facility.
- In order to access this service, pregnant women can visit [https:// pmsma.nhp.gov.in/](https://pmsma.nhp.gov.in/) or download the 'PMSMA' mobile application.

### 5. Rashtriya Bal Swasthya Karkyakram (RBSK)

- It is a significant effort aimed at early detection and intervention for children aged newborn to 18 years, covering the four 'D's':
  - a) Birth Defects,
  - b) Deficiencies,
  - c) Diseases,
  - d) Developmental Delays including Disability.

## Current Situation of Maternal and Child Health Indicators in India

- Only 11 percent of children aged 6 to 23 months had an adequate dietary intake.
- Overall, 67 percent children in the age group of 6 to 59 months; 53 percent of pregnant women (15-49 years) and 57 percent of adolescents (15-19 years) were anaemic (NFHS, 2021).
- The increase in the percentage of children suffering from anaemia- from 59 percent in NFHS-4 to 67 per-cent in NFHS-5- is even more concerning.
- India is still falling short of meeting SDG 2.2, as the percentage of stunted, wasted, underweight, and anaemic children in India is 36 percent, 19 percent, 32 percent, and 67 cent, respectively.
- One-third (32 percent) of adolescents aged 10-19 years were zinc deficient.

## Way Forward

- There is a need to re-energise the 'Jan Andolan' component by accelerating momentum and action from every person in this battle against malnutrition.
- Three main areas have been identified and some examples as pointers for action in the space of public health nutrition in India are provided below.

### Policy Strengthening

- Adopting and adapting evidence-based success stories in regions that need more support:
- Using financial levers for maximum impact.
- Restricting advertising and marketing of unhealthy and unsustainable foods targeted towards children, youth and other vulnerable groups.
- Applying effective and efficient food labelling laws and regulations.
- Push for agricultural policies emphasising quality, nutritious and sustainable food production practices rather than concentrating only on producing greater quantities of food.
- Urgently investing in public policies and innovations that will reduce food loss and food waste.
- Demonstrating leadership and commitment to ensure coherent food system actions.

### Address Logistic Challenges

- Convergence and coordination still remain a huge challenge.
- Vacancies and manpower.
- Fund utilisation.
- Better planning and maximal use of data being collected under national programs and schemes
- Improved monitoring and surveillance with use of technology must be effectively implemented.

### Improve Education, Research and their Dissemination

- Encourage research on the determinants and actions to create an evidence base of systemic drivers and actions, including indigenous and traditional approaches to health and wellbeing.
- Ensure capacity building mechanisms.
- All certified nutrition and health professionals working in the field must have a demonstrable level of competence in public nutrition.

## Progressing Nation through Make in India

### Introduction

- The 'Make in India' programme is transforming India and making it a business hub for global manufacturers across a variety of sectors like automobiles, electronic consumer goods, pharmaceuticals, defence systems, aviation among others who have turned to India as their destination to disrupt the existing global supply chain.
  - The initiative was formally introduced on September 25, 2014 by PM at Vigyan Bhawan, New Delhi, in the presence of business giants of India.

### Aim

- It is designed to facilitate investment and foster innovation while boosting skill development that would finally build one of world's best manufacturing infrastructure in India.
- It is also aimed at attracting global investments and make India a global manufacturing hub.
- Spearheaded by the *Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry* the programme is the key to the growth of India's economy as it would create employment opportunities while eliminating the unnecessary laws and regulations, making bureaucratic processes easier, government process more transparent, responsive and accountable.

## Focus of the programme

- The focus of the programme encompasses 25 sectors including automobiles, automobile components, aviation, biotechnology, chemicals, construction, defence manufacturing, electrical machinery, electronic systems, food processing, IT & BPM, leather, media and entertainment, mining, oil and gas, pharmaceuticals, ports and shipping, railways, renewable energy, roads and highways, space, textile and garments, thermal power, tourism and hospitality and wellness.

## PLI Scheme

- In the Union Budget 2021-22, an outlay of Rs 1.97 lakh crore for the PLI Schemes for 13 key sectors was announced, to create national manufacturing champions and generate employment opportunities for the country's youth.
  - The initiatives provide a much needed push to India's manufacturing sector and when cumulative efforts combine, will also make India a superior domestic manufacturer and a favourable investment centre.
  - The aim is to create a robust manufacturing sector by not only inviting foreign companies to set up operations in India but also enhance India's exports and manufacturing capabilities for high-quality, competitive products.

## Impacts of 'Make in India'

- Make in India has already created a strong impact in form of improved business environment and economic growth. Some of the recent highlights include:
  - India is now 4th amongst the world's most attractive investment destinations
  - According to UN, India is forecast to grow at 10.1 percent in 2022, becoming the fastest-growing major economy in the world
  - India ranks among the top 50 nations in the latest 2021 edition of the *Global Innovation Index (GII)*.
  - India has held onto its position as the world's most valuable nation brand.
  - India maintained **43rd rank** on an annual *World Competitiveness Index* compiled by the Institute for Management Development (IMD) that examined the impact of COVID-19 on economies around the world this year.

## Major Sectoral Success Stories of Make in India

- Defence:** Under the Aatma Nirbhar Bharat campaign, the defence sector has been identified as one of the core areas to boost 'Make in India'.

### Some of the recent highlights include:

- The production plan of over 500,000 **AK-203 assault rifles** goes on stream.
- 108 military weapons and systems including next-generation corvettes, airborne early warning systems, tank engines and radars are to be made in India.
- South Korean major Hyundai Heavy Industries (HHI) and public sector Hindustan Shipyard Limited, Visakhapatnam, joining hands to build warships. Another Korean firm, Samsung, will be collaborating with Kochi Shipyard to liquefied natural gas (LNG) tankers.
- The **INS Visakhapatnam**, one of the four stealth guided-missile destroyer ships under project 15B, has been indigenously manufactured the Mazagon Dock Shipbuilders.
- Moving ahead on its Rs 6,000-crore 'Make in India' project for military helicopters, Russia has informed the Ministry of Defence about a partnership with Reliance Defence to manufacture Kamov 226T choppers locally.
- Global aviation major Pratt and Whitney, has committed to set up its R&D facilities in Haryana.*
- French drone manufacturer LH Aviation has announced a manufacturing plant in India to produce drones.
- Boeing announced setting up a factory to assemble fighter planes, either the Apache or Chinook defence helicopter in India, as well as the manufacture of the F/A-18 Super Hornet.

- Manufacturing Sector:** According to Department for Promotion of Industry and Internal Trade (DPIIT), cumulative FDI inflows in the manufacturing subsectors amounted to USD 100.35 billion between April 2000 and June 2021.

- The manufacturing sector is expected to reach USD 1 trillion by 2025 and contribute about 25 percent to India's GDP.
- As per the World Bank, manufacturing contributed about 16 percent to the country's GDP in 2016. The global average of about 15 percent in 2015.

**Some of the recent highlights in the sector include:**

- a. Information technology major Zoho, announced that it will invest Rs. 50-100 crore and form a new company that will focus on research and development (R&D) in the manufacturing sector.
- b. Wistron Corp. collaborated with India's Optimus Electronics to manufacture products such as laptops and smartphones, giving a major boost to the 'Make in India' initiative and electronics manufacturing in the country.
- c. Amazon India announced to start manufacturing electronic products in India, starting first with Amazon Fire TV stick manufacturing.
- d. Samsung started manufacturing mobile display panels at its Noida plant and plans to ramp up manufacturing IT display panels soon.
- e. Bharti Enterprises Ltd. and Dixon Technologies (India) Ltd., formed a joint venture to take advantage of the government's PLI scheme for the manufacturing of telecom and networking products.
- f. Godrej Appliances launched a range of Made-in-India air conditioners (AC).
- g. American manufacturing major Flex that raked in over \$25 billion in revenue last year has been operating in India now trails only the Taiwanese giant Foxconn in terms of scale in India - is now pulling up its socks to double its manufacturing revenue in five years.
- h. Taiwanese Apple supplier Foxconn will start to assemble the iPhone 12 in India, marking the first time the flagship device has been made outside of China.

**3. Automobiles:** Global car majors have been ramping investments in India to cater to growing domestic demand.

- In an effort to address this, federal policymakers are developing a mobility option that is "Shared, Connected, and Electric" and have projected an ambitious target of achieving 100 percent electrification by 2030.
- The EV market in India will be a USD206 billion opportunity by 2030, if India maintains steady progress to meet its ambitious 2030 target.
- Another report by *India Energy Storage Alliance (IESA) projects* that the Indian EV market will grow at a CAGR of 36 percent till 2026.
- The EV battery market is also projected to grow at a CAGR of 30 percent during the same period.
- To boost Electric Vehicles in India, the *FAME India Scheme II* is proposed to be implemented over a period of 3 years with a financial outlay of Rs. 10,000 Crore, for faster adoption of electric mobility and growth of electric and hybrid technology to improve the eco-system in the country.

**Some of the recent highlights in the sector include:**

- a. Kia invested over \$1.1 billion to build a car manufacturing plant in Anantapur, Andhra Pradesh.
- b. American electric vehicle and clean energy company Tesla Inc. marked its entry into India by incorporating its subsidiary, Tesla India Motors and Energy Pvt Ltd, in Bengaluru.
- c. Ather Energy, India's first intelligence EV manufacturer moved its USD 86.5 million factory from Bengaluru (Karnataka) to Hosur (Tamil Nadu).
- d. Ola Electric, the subsidiary of the unicorn Indian ride-hailing start-up, also announced that it would be setting up the world's largest electric scooter plant in Hosur over the next 12 weeks, at a cost of USD 330 million, and aiming to produce 2 million units a year.
- e. Sterling and Wilson Pvt Ltd (SWPL), India's leading engineering, procurement, and construction company announced its entry into the electric mobility segment in India.
- f. Hitachi had set-up an auto-component plant in Chennai which increased their employees count from 10,000 to 13,000.

**4. Retail:** Indian retail industry has emerged as one of the most dynamic and fast-paced industries due to the entry of several new players.

- It accounts for over 10 percent of the country's gross domestic product (GDP) and around eight percent of the employment.
- India is the world's fifth-largest global destination in the retail space.
- India ranked 73 in the United Nations Conference on Trade and Development's Business-to-Consumer (B2C) E-commerce Index 2019.

- India is the world's fifth largest global destination in the retail space and ranked 63 in World Bank's Doing Business 2020.
  - In FDI Confidence Index, India ranked 16 (after US, Canada, Germany, United Kingdom, China, Japan, France, Australia, Switzerland, and Italy).
  - Online retail market in India is projected to reach USD 350 billion by 2030 from an estimated USD 55 billion in 2021, due to rising online shoppers in the country.
5. **Renewables** : India aims to achieve 40 percent of installed power generation capacity from non-fossil fuel sources and reduce emission intensity of GDP by 33-35 percent by 2030 from 2005 level.
- With the accomplishment of these ambitious targets, India will become one of the largest Green Energy producers in the world, surpassing several developed countries.
  - Solar Power tariff is reduced by more than 75 percent using plug and play model.
  - India submitted its *Intended Nationally Determined Contribution (INDC)* to the UNFCCC, on its goal of installing 175 gigawatts (GW) of renewable power capacity by 2022 by setting a new target to increase the country's share of non-fossil-based installed electric capacity to 40 percent by 2030.
    - A total of 150 GW renewable energy capacity (including large hydro) has been installed in the country till November 2021.
    - Projects of 63.64 GW capacity are under various stages of implementation and 32.06 GW capacity are under various stages of bidding.
6. **Pharmaceuticals**: India is the largest provider of generic drugs globally. Indian pharmaceutical sector supplies over 50 percent of global demand for various vaccines, 40 percent of generic demand in the US and 25 percent of all medicine in the UK.
- Globally, India ranks 3<sup>rd</sup> in terms of pharmaceutical production by volume and 14<sup>th</sup> by value.
  - According to the Indian Economic Survey 2021, the domestic market is expected to grow 3X in the next decade.
  - India's domestic pharmaceutical market is estimated at USD 42 billion in 2021 and likely to reach USD 65 billion by 2024 and further expand to reach- USD 120-130 billion by 2030.
  - India's medical devices market stood at USD 10.36 billion in FY20.

## Conclusion

- Aatmanirbhar Bharat or a self-reliant India is a vision of making India a self-reliant nation and does not aim to be protectionist in nature or to cut off the country from rest of the world.
  - The vision comes from the realisation that we first need to focus on innovation, capability building, and skilling.
  - The aim is to invest in local companies that will be the competitors of global companies, for domestic as well as export purposes.

## e-Health Services and Technology Interventions

### Introduction

- e-Health can be described as the delivery of healthcare services using electronic information and communication technologies.
  - e-health services are provided in a setting where healthcare providers and patients are not directly in contact, and the interaction is mediated through electronic means.
- It consists of different electronic health data exchange such as:
  - a. **Telemedicine**: It also referred to as telehealth, can be described as the remote delivery of healthcare services including medical examinations and consultations using telecommunication services.
    - ✓ It provides healthcare providers the opportunity to evaluate and treat patients without being physically present.
  - b. **mHealth (mobile health)**: It refers to the practice of medicine and welfare using mobile smart devices.
  - c. **Electronic Health Records (EHR)**: EHR is a systemised collection of patient history stored electronically that can be accessed across multiple formats.
  - d. **Wearable Sensors**: It refer to the health monitors which help in tracking an individual's body functions like heart rate, sleep quality, oxygen levels, etc.
- The **World Health Organisation** defines three key areas of e-Health as:

1. Delivery of health information and records, for both the professionals as well as the consumers.
2. Using the power of information technology and e-commerce platforms to improve the public health infrastructure.
3. Use of e-commerce and e-business practices in health management systems.

### Importance of e-health services in pandemic

- The onslaught of the pandemic brought upon us an increased need of healthcare services in times when the entire world was in lockdown.
  - Such situations led to an increased demand for dispensing healthcare services using internet and telecommunication services.
- Many governments across the world have supported the critical imperative of enabling private companies to produce innovative tools which enable authorities to identify suspected patients and carriers, identify their trail and contain any people they may have come in contact with.
  - These technologies involve facial recognition cameras, drones and sensors which enable gauging a person's body temperature as well as their medical condition.
- Experts suggest a massive increase in the global digital health or e-health market both from the demand and supply side.
  - The digital health market is expected to experience a 29.6 percent compounded annual growth rate from 2019 to 2025.
- In 2018, the digital health market stood at USD 86.4 billion and is expected to reach approximately over USD 500 billion by 2025.

### Advantages

1. **Efficiency:** Using modern technology within healthcare enables professionals to reduce inefficiency, save time and accurately diagnose and treat diseases.
2. **Reduction in cost:** More efficient treatments lead to reduction in cost. One potential way is by dodging duplicative assessment through improved communications between healthcare providers and electronic medical records.
3. **Empowerment:** e-Health services enable both the consumers and healthcare providers to feel more empowered by making available the knowledge base of medical data and health records over the internet.
4. **Better relations:** e-Health services can enable better relations between the patient and the expert since it provides clear and easier channels of communication.
5. **Equity:** e-Health is a great concept for reducing the gap between the haves and the have nots. It enables equitable healthcare access irrespective of age, race, gender, ethnicity, geography, etc. Digital health also enables access of better healthcare facilities to remote locations.
6. **Education:** e-Health services are beneficial for educating healthcare professionals of any medical advancements. These services can also be beneficial for consumers to educate themselves about personalised preventive healthcare.
7. **Faster decision making:** With the advent of decision-making software and increased automation, decision making in medical situations have become much faster and more efficient.

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## Major trends in digital health in the post COVID-19 world

1. **Smartphones:** With the increasing number of smartphones consumers, these devices can be used to effectively operate digital technology to support healthcare facilities, address the growing health concerns and support the use of m-health services.
2. **Big Data:** Big data is expected to be a game changer in this space by providing lower rate of medication errors.
3. **Virtual Reality:** Virtual Reality has already started making its mark in the digital health world by providing support in treating anxiety, post-traumatic stress and stroke, among others. Virtual Reality is stated to play a major role in complicated surgeries.
4. **Wearables:** In the age of smart watches, fitness bands, sugar monitors etc, wearables are playing an important role in making patients aware of the likelihood of a health emergency.
  - With wearables tracking heart rate, exercise levels, sleep quality etc, these can play a key role in providing up to date monitoring of high-risk patients.
5. **Artificial Intelligence (AI):** The power of artificial intelligence can be seen in areas such as precision medicine, medical imaging, drug discovery and genomics.
  - Additionally, the use of chatbots and virtual assistants shall see a sharp increase in the times to come.
6. **Blockchain:** Blockchain technology has already been deployed to create digital versions of medical charts.

## Digital health market in India

- In India, the digital health market was valued at Rs. 116.61 billion (USD 1.57 billion) in 2018. The market is estimated to reach Rs. 485.43 billion (USD 6.53 billion) by 2024, expanding at a compound annual growth rate of approximately 27.41 percent during the 2019-2024 period.
  - According to *India's e-Health Market Opportunity Report 2021*, the e-health market is projected to hit USD 10.6 billion in revenue by 2025.
  - The telemedicine market has the maximum potential within e-health in India and is expected to touch USD 5.4 billion by 2025, growing at a compound annual growth rate of 31 percent.
- According to a recent report it is estimated that even though e-pharmacy is at a nascent stage in India, it is expected to reach USD 4.2 billion by 2025.
- The overall health tech market in India is stated to reach USD 21.3 billion by 2025 acquiring 3.2 percent of the global health tech market pie.
- India is now also home to 133 health tech start-ups that have seen increased demand during the lockdown.

## Healthcare services through social media

- During the peak of COVID-19, many people received aid by sharing their requirements through WhatsApp, Instagram, Twitter and Facebook.
- Messages regarding availability of oxygen cylinder, hospital beds, lifesaving drugs, home cooked meals and other essential equipment were often seen circulating on social media platforms.
- It was during this time that many mental health applications and online therapy sessions were introduced to provide people with safe spaces to talk about anxiety, loss, loneliness and other mental health issues brought on by the pandemic.

## Steps taken by Government for Healthcare services

- Healthcare services in India remain unevenly distributed. Rural India, in particular, has unreliable access to medical and healthcare services.
  - In the absence of an organised modern healthcare system, traditional practices remained widely prevalent, often posing a fatal risk to patients who tend to be unaware of potential diseases and cures.
- In order to extend the delivery of healthcare services and expand the public healthcare system to all corners of the country, the *Ministry of Health and Family Welfare (MoHFW)* has undertaken measures to promote digital healthcare with a view to empower citizens through the dissemination of crucial information.
  - Among the first steps taken by the Government of India was establishing the *National eHealth Authority (NeHA)* in 2015 that would serve as a promotional, regulatory and standards-setting organisation in the health sector.
  - NeHA has a goal to ensure development and promotion of eHealth ecosystem in India and enable the organisation, management and provision of effective people-centred health services to all in an efficient, cost-effective and transparent manner.

- In view of the risks posed by the lack of penetration of health services, the MoHFW, through a comprehensive nation-wide *e-health programme*, hopes to address the gap in human resource and ensure efficiency, improve patient safety through access to medical records, reduce healthcare cost, improve training and capacity building, and aid in evidence-based planning and decision making.
- To this end, the ministry outlined various initiatives in the *National Health Policy, 2017* that aim to deploy digital tools to improve the efficiency and outcome of the healthcare system in India.
- The first aspect of digitising health services in India is the *Interoperable Electronic Health Records (EHRs)*.
  - EHRs are an online repository of medical records of citizens that facilitate continuity among different healthcare providers, ensure affordability of service, and promote a better decision support system.
  - Standards for HER have been determined and notified in December 2016.
  - A key element of electronic records is interoperability, or the ability of computer systems to use and exchange information.
  - The guidelines for this were determined and notified by the Ministry of Electronics and Information Technology in August 2018 under which all public and private health facilities have been issued National Identification Number (NIN).
- A *Hospital Information System (HIS)* is being implemented for computerised registration and capturing of patients' EHRs.
  - The HIS improves efficiency and leads to better delivery of services to patients.
  - These digital repositories are also accessible to individual patients themselves on a single online personal medical record storage platform.
  - This centralised platform improves accessibility and sharing of personal health data, making it easier for patients to track their medical histories and share with physicians at ease.
- The MoHFW has also implemented a framework for the *National Health Stack (NHS)* that has recommended a *National Digital Health Blueprint*.
  - The blueprint details a pathway for the holistic adoption of digital technologies based on global best practices.
  - Key features of the blueprint include a Federated Architecture, a set of architectural principles, a 5-layered system of architectural building blocks, Unique Health ID (UHID), privacy and consent management, national portability, EHR, applicable standards and regulations, health analytics and above all, multiple access channels like call centre, Digital Health India portal and MyHealth App.
- India's experience with the successful AarogyaSetu app is a testament to the growing public ease with e-health services.
  - Developed in a record 21 days, the AarogyaSetu app quickly became the most downloaded COVID-19 tracking app in the world.
  - However, the app continued to serve the Indian people in another crucial matter: checking for the availability of and registering for COVID-19 vaccines.
  - India's vaccine rollout, aided in large part by the AarogyaSetu app, has been internationally acclaimed.
- To facilitate greater adoption of telemedicine, the government has undertaken the implementation of the *National Telemedicine Network (NTN)* that provides telemedicine services to the country's most remote areas by upgrading existing government healthcare facilities in all states.
  - This service aims to overcome existing challenges like the lack of specialists and inaccessibility of doctors in rural areas by using information technology in delivering healthcare services.
  - The Government of India also manages the *eSanjeevani portal, a doctor-to-patient telemedicine system* under Ayushman Bharat Scheme.
  - Through eSanjeevaniOPD (Outpatient Delivery), any individual may seek medical advice and medication through audio and video.
  - The government released the *Telemedicine Practice Guidelines (TPG)* in March 2020 prescribing rules regarding physician-patient relationships, issues of liability and negligence, evaluation, management and treatment, informed consent, continuity of care, among others.
- A number of new portals and websites have also been introduced to promote better penetration of health services and related information.
  - a. The MoHFW has launched a website to monitor Health and Wellness Centres (HWCs) under the Ayushman Bharat Scheme.
  - b. To improve the quality of care in labour rooms and maternity operation theatres, a dashboard called *LaQshya* has also been launched, the data for which is updated by states.

- c. An application that prevents, controls and screens for non-communicable diseases (NCDs) is also maintaining by the MoHFW.

### Conclusion

- The pandemic has presented our country with a myriad of opportunities towards boosting technological advancements in the healthcare sector.
- India's advancements in this sector with a strong push from the government has proven well to the country's advancements.
- Given India's vast diversity and population size the sector presents tremendous opportunities and scope in the future. Extending the idea of the age old saying of 'Health is Wealth', we can safely say that new technology will be a great investment in Indian care system.



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