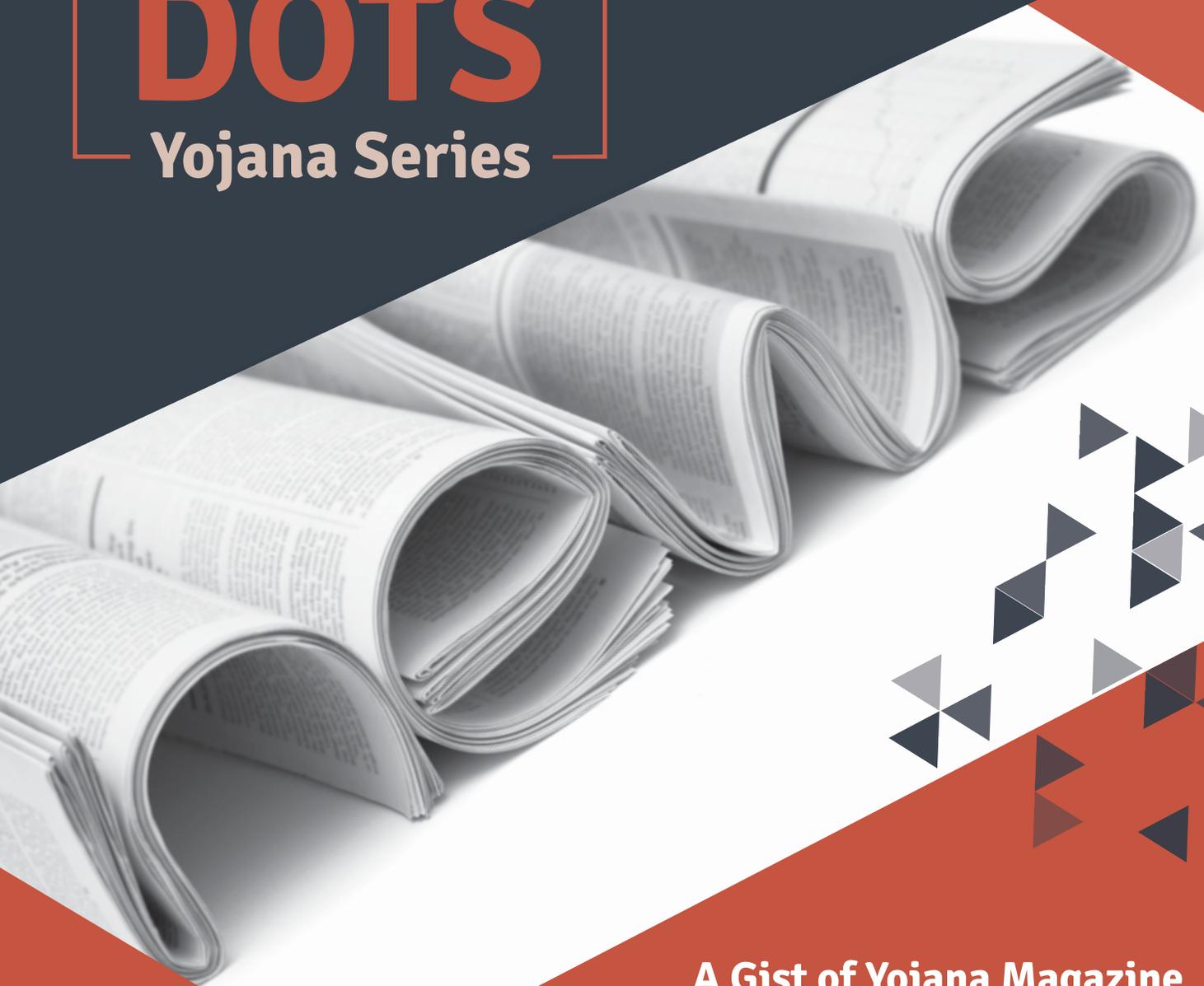


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A Gist of Yojana Magazine (June 2020 issue)

- Industry 4.0
- Social Media: The Force Multiplier
- Migration & Economic Growth
- Online Learning in Lockdown



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June, 2020

Technology

Industry 4.0

- Industry 4.0 is signalling a change in the traditional manufacturing landscape. Also known as the Fourth Industrial Revolution, Industry 4.0 encompasses three technological trends driving this transformation: connectivity, intelligence and flexible automation.
- **Evolution of the four Industrial Revolutions**
 - The first industrial revolution came with the advent of mechanisation, steam power and water power.
 - The second industrial revolution revolved around mass production and assembly lines using electricity.
 - The third industrial revolution came with electronic and IT systems and automation. The fourth industrial revolution is associated with cyber-physical systems.
 - Industry 4.0 describes the growing trend towards automation and data exchange in technology and processes within the manufacturing industry, including: The Internet of Things (IoT), The Industrial Internet of Things (IIoT), Cyber-physical Systems (CPS), Smart Manufacturing, Smart Factories, Cloud Computing, Additive Manufacturing, Big Data, Robotics, Cognitive Computing, Artificial Intelligence & Blockchain etc. A combination of cyber-physical systems, the Internet of Things and the Internet of Systems make Industry 4.0 possible and the smart factory a reality.
- Product innovation is continually giving way to new concepts that have technology built into them. Our innovation has become increasingly complex, connected, and contextual.
- Industry value chains are being radically redesigned to accommodate connected worlds being more reliant on everything being digital. As we continue to design manufacturing to be fully connected-up, we can adjust faster, scale differently, and deliver quantities to varying cycles of demand, closer to the need of the day and more appealing to the customers.

Emerging Digital Business Models

- As we connect more, the customer experiences can hugely benefit. We can target, sell, and market on greater connecting knowledge platforms. We can understand channel choice and provide more tailored pre- sales and post-sales support to manage the entire lifecycle as we continue to build the connected industry 4.0 ecosystems.
- Further, Blockchain technology is not only disrupting banking and finance, but it also has the potential to impact many industries and community as a whole.

Industry 4.0 Post COVID-19

- Industry 4.0 is not only as applicable as it was before but it is actually far more relevant moving forward. The priorities for most manufacturers today fall into three distinct Stages: Stage 1 – Survival; Stage 2 – Recovery; Stage 3 – Business as usual in the new post- crisis paradigm.
- COVID-19 is causing radical shifts in workflow across the globe as millions practise social distancing and comply with self-quarantine recommendations.
- Although businesses have had reason to embrace digital workflows in the past, COVID-19 has provided another strong incentive to move towards a smart factory, complete with smart manufacturing or smart printing processes.

COVID-19 Leading to Digital Transformation

- The impact of the COVID-19 pandemic has demonstrated the value of IT and digital transformation across industries and businesses and they must utilise this time to speed up the transition.
- Digital Industry 4.0 plays a vital role in envisioning and modelling outbreaks. As the pandemic continues to spread around the world, it will become imperative for organisations to look for new solutions or ways to stay ahead of the competition.
- While office employees and knowledge workers are able to shift to remote work as the default operating mode, most factories are simply not designed to be managed remotely and lack the digital tools and infrastructure needed to support such activities.
- Organisations that adapt their technological capacity and investments on digital platforms can alleviate the impact of the COVID-19 and keep their businesses running in the long term.

- Going forward, many organisations may adopt remote- working agreements as strategies to reduce costs, improve productivity, and increase worker satisfaction. Many manufacturers are increasing efforts to equip their human workers with digital connected-worker tools that incorporate safety checks into workflows
- This is also the dawn of a new era where ‘frontline’ workers and desk workers are harmonised with tools that can support the flow of collaboration and data, where something that happens on the factory floor initiates a communication or workflow in the back office.

AIM: Fostering Innovation

Social entrepreneur is a creature of his or her time—a hybrid that combines the driving passion for improving a lot of excluded groups with the practical, innovative and opportunistic traits of the entrepreneur. Social entrepreneurs are focused on the delivery of public goods using business approaches.

India, The Innovator: Gathering Momentum

The last few years have seen innovation in India reach a tipping point with the emergence of innovative Indian companies, the large-scale social innovations and now the big impact innovations in public service.

- SKS Microfinance¹ has successfully innovated on the Grameen Bank Microfinance Model. This Business Model Innovation has figured out a unique way to ‘scale up’ the penetration and impact of a Microfinance organisation.
- Akshay Patra is the world’s largest NGO-run school meal program—it reaches 10 million children across five States of India, six-days a week. And they serve freshly cooked meals at Rs. 1.50 per meal. This was achieved through a ‘technological Innovation: to prepare meals on large scale in a short time’ and a ‘logistics innovation-to reach the meals to the schools’.
- Goonj— created rural value from urban waste in a manner that is mutually dignified
- MV Foundation—a new way to take kids out of child labor and into schools are bringing through Non-linear solutions for the country’s huge developmental challenges.

Atal Innovation Mission

Government of India has set up Atal Innovation Mission (AIM) to promote a culture of innovation and entrepreneurship in the country.

- **Atal Tinkering Labs-** Creating problem-solving mindset across schools in India.
- **Atal Incubation Centres-** Fostering world-class startups and adding a new dimension to the incubator model.
- **Atal New India Challenges-** Fostering product innovations and aligning them to the needs of various sectors/ ministries.
- **Mentor India Campaign-** A national Mentor network in collaboration with public sector, corporates and institutions, to support all the initiatives of the mission.
- **Atal Community Innovation Centre-** To stimulate community centric innovation and ideas in the unserved /underserved regions of the country including Tier 2 and Tier 3 cities.
- **ARISE-** To stimulate innovation and research in the MSME industry.

Initiatives under Atal Innovation Mission

1. **Atal Tinkering Labs - at School Level:** Over the last two years, AIM has launched the establishment of thousands of Atal Tinkering Labs enabling students from grade 6 to grade 12 to have access to and tinker with innovative tools and technologies like 3D printers, robotics, miniaturised electronics do-it-yourself kits, thus stimulating a problem solving innovative mindset to solve problems in the community they are in.
2. **Atal Incubators at Universities, Institutions, Industry Level:** To promote creation of a supporting ecosystem for start-ups and entrepreneurs, AIM has been establishing world-class incubators called Atal Incubation Centres (AICs) in universities, Institutions, corporates, etc. that would foster world-class innovative start-ups and become scalable and sustainable enterprises.

Some schemes under this include:

- Indo French Knowledge Summit at Lyon - 5 AIC startups - received immediate funding interest by VCs.
 - Youth-CoLab Sustainable Innovation Challenge along with UNDP—based on Gandhian Values.
 - Entrepreneur World Cup National Innovation Challenge - CCAMP AIC Startup emerged as India winner.
 - Ongoing discussions and interests expressed for Incubator and Startup collaborations by Indo German, Netherlands, Swedish, French, Australian Embassies, US India Business council, etc.
 - Bill and Melinda Gates Foundation partnership in AIC/Startup Training.
 - UNLEASH Startups Challenge with Netherlands embassy support.
3. **Atal Community Innovation Centres - Serving Unserved and Under-Served Regions of India :** To promote the benefits of technology led innovation to the unserved/ underserved regions of India including Tier 2,

Tier 3 cities, aspirational districts, tribal, hilly and coastal areas, AIM is setting up Atal Community Innovation Centres with a unique partnership driven model wherein AIM would grant up to Rs. 2.5 crore to an ACIC subject to a partner proving equal or greater matching funding.

4. **Atal New India Challenges - Product and Service Innovations with National Impact** : To create product and service innovations having national socio-economic impact, AIM has launched over 24 Atal New India Challenges in partnership with five different ministries and departments of central government.
5. **Applied Research and Innovation for Small Enterprises (ARISE) - to Stimulate MSME Industry Innovation**: To promote innovation in a phased manner in the MSME/Start-up sector AIM will be launching ARISE along with partner Ministries so that great research ideas are converted to viable innovative prototypes followed by product development and commercial deployment.
6. **Mentorship and Partnerships - with Public, Private sector, NGOs, Academia, Institutions**: To enable all the initiatives to succeed, AIM has launched one of the largest mentor engagement and management program “Mentor India – The Mentors of Change”. For example, The Defence Institute for High Altitude Research (DIHAR) in Ladakh has played an innovative and transformational role in accelerating the socio- economic development of Ladakh.

Social Media: The Force Multiplier

- The beauty of the new age social media tools lies in their universality and pervasiveness. They are easy to install and use and have a simplified user experience. While the physical world is constrained by the limitations of distances and boundaries, the virtual world is all encompassing– indeed we are all part of a continuous global village. As Bill Gates famously said - “*The Internet is becoming the town square for the global village of tomorrow*”.
- Inexpensive mobile phones, cheap bandwidth and data-plans, vernacular content–all these factors acting in consort have helped in amplifying social media’s reach and impact even in the rural hinterlands
- Here is a compilation of twelve ways in which Indian Government agencies are using social media as a force multiplier in their work:
 - **Crisis Management**: Social media is now increasingly being used by governments to reach out to citizens during such crisis. Two recent examples bear out this trend– the first one is a cyclone alert from the National Disaster Management Agency (NDMA) on India’s eastern coasts(odisha), while the other one is an advisory from PIB (Indian Government’s Press Information Bureau) to citizens for the lockdown imposed due to COVID-19.
 - **Citizen Engagement**: One of the best roles social media can play is to act as a medium for continuous engagement between governments and its citizens. Apart from MyGov, other social media channels used by the Indian Government (Twitter, Facebook, WhatsApp, Instagram) also promote citizen engagement, participation, and transparency
 - **Citizen Grievances & Support**: Social media has emerged as a very impactful, real-time channel for citizen grievances and support. Most citizen services (specially the public facing ones) maintain active accounts on social media and encourage citizens to directly reach out with their grievances. Sometimes when the query gets resolved quickly, citizens express their gratitude and elation immediately. This expression can act as an authentic validation or testimonial for the service.
 - **Law & Order**: The Police frequently needs to make public announcements–something that social media is well-suited for.
 - **Hiring & Recruitment**: Some government agencies are using social media hiring channels for attracting best-in-class talent for their job vacancies. “LinkedIn” is a popular online recruitment platform
 - **Foreign Relations**: Social media bridges the distance between nations on the internet. Many governments agencies are using social media channels effectively to engage with their foreign counterparts.
 - **Business & Industry Relations**: Many monetisation models on the internet (wholly or partially) rely on enterprises, B2B (business to business) and large corporations with large advertising and marketing budgets, which contributes to the nation’s economy.
 - **Live Traffic Updates**: Real time traffic updates and advisories get regularly shared in the metropolitan cities via the local Traffic Police social media accounts
 - **Government Procurement**: Traditionally, tender notices were advertised in newspapers; now with the advent of e-tendering, these notices are increasingly getting posted on social media channels as well.
 - **Crowdsourcing Ideas & Innovation**: Crowdsourcing is a popular activity on the internet, where you get to tap into the collective “wisdom of the crowds”.

- **Citizen Service-Delivery Apps:** The government has launched various service delivery apps for its citizens. The two examples here showcase this—DigiLocker is meant for digitised documents & certificates, while UMANG is like a gateway (or a directory) to multiple government services.
- **Transparency & Accountability:** Social media can come to the rescue. Social media can come to the rescue in many such cases.

Digital Platforms

- The 'Arogya Setu' App enables people to assess themselves the risk for their catching the coronavirus infection. It calculates this based on people's interaction with others, using cutting-edge Bluetooth technology, algorithms and artificial intelligence.
- The personal data collected by the App is encrypted using state-of-the-art technology and stays secure on the phone till it is needed for facilitating medical intervention and is available in 11 languages.
- The Government of India has launched a WhatsApp chatbot so that the citizens can get instant and authentic answers to all of their queries
- **Corona Kavach:** It is a COVID-19 tracker application that provides users with real-time location of infected users who have activated the 'Kavach' feature.
- **SAMPRAC:** Defence Research and Development Organisation (DRDO) has developed an app called 'SAMPRAC' to enable tracking people under quarantine. It is a software that includes an app that can be installed on the smart phones of the infected COVID-19 patients. It is a server-side application that is used by the state authorities to track the patients.
- The system enables geo-fencing, AI-based automated face recognition (between selfie taken during registration and subsequent selfies sent by the patient), and would have the capability to display the information to the state officials on a map which can be colour-coded to depict hotspots and containment zones.
- **SAHYOG:** The Survey of India (SoI) has developed an e-platform that collects geotagged information on the nation's critical infrastructure in order to help the government and public health agencies take critical decisions in response to the current COVID-19 pandemic situation.
- The mobile based application, called SAHYOG, works as a key tool in helping community workers carry out the government's objectives of door-to-door surveys, contact tracing, deliveries of essentials items and to create focused public awareness campaigns.
- **BHIM (Bharat for Money)** is an Indian mobile payment app developed by the National Payments Corporation of India (NPCI), based on the Unified Payments Interface (UPI). It was launched on 30th December, 2016 and helps in facilitating e-payments directly through banks as a drive towards cashless transactions. Transactions on BHIM are nearly instantaneous and can be done 24/7 including weekends and bank holidays.
- **UMANG (Unified Mobile Application for New-age Governance)** is a Government of India all-in-one single unified secure multi-channel multi-platform multi-lingual multi-service freeware mobile app for accessing over 1,200 central and state government services in multiple Indian languages over Android, iOS, Windows and USSD (feature phone) devices, including services such as AADHAAR, Digi Locker, Bharat Bill Payment System, PAN, EPFO services, PM-KVY services, AICTE, CBSE, tax and fee or utilities bills payments
- **The Study Webs of Active-Learning for Young Aspiring Minds (SWAYAM)** seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy. It is done through a platform that facilitates hosting of all the courses, taught in classrooms from Class 9 till post-graduation to be accessed by anyone, anywhere at any time.

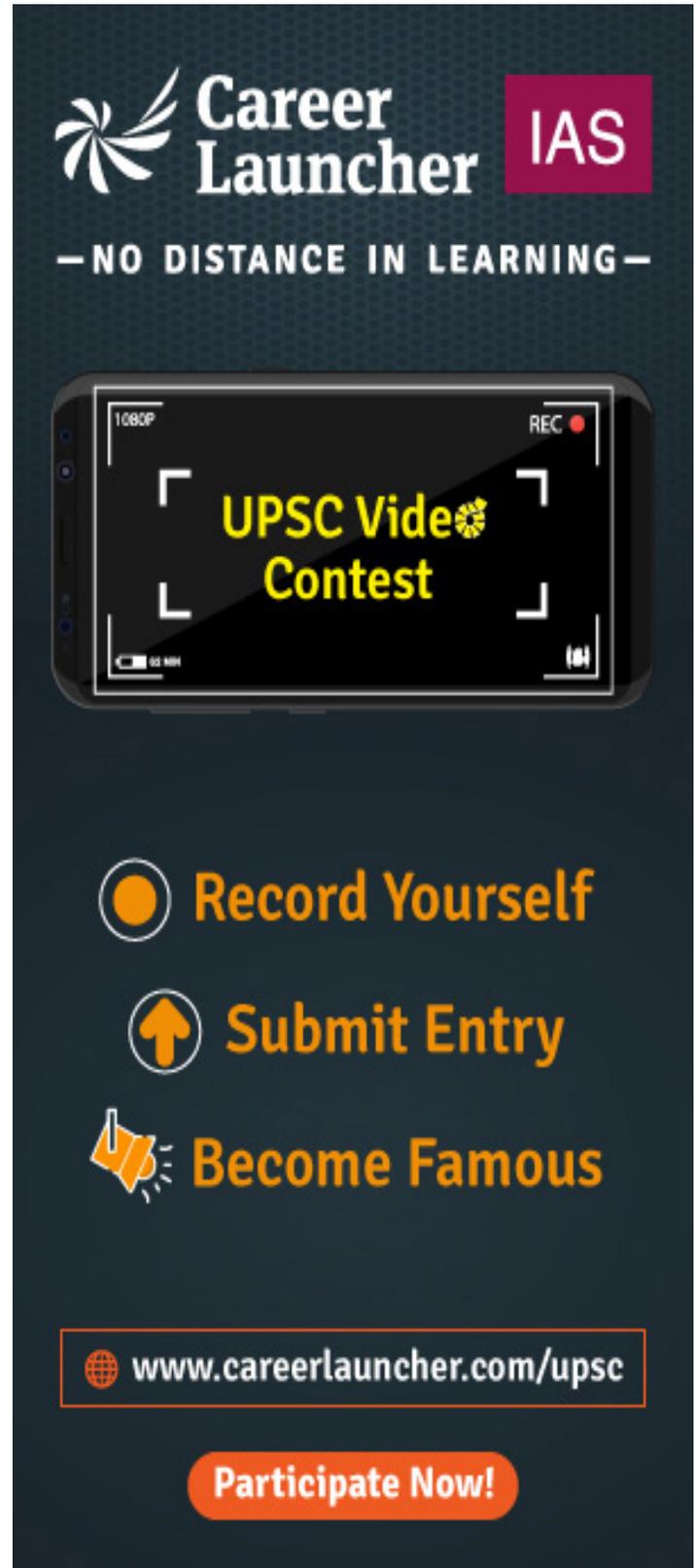
Localisation Through Artificial Intelligence

- Artificial intelligence has started to change the very face of local language technologies, products, tools, services and features. As a result, developers have been able to simplify and augment user experiences and facilitate better productivity for Indian language users. Virtual assistants now understand verbal commands given in Hindi.
- Office applications take advantage of Microsoft Translator which in turn leverages the machine translation engine, empowered by the latest generation neural machine translation technologies. Google Docs too can accomplish the task for you. Both the Office suites draw their power from services running at a cloud server.
- Apart from the Internet and mobile (like on Bing and Microsoft Translator for Android), language translation power can be experienced in familiar productivity and communication applications including Word, Excel, PowerPoint, Outlook, and Skype.
- Considering the way business opportunities are emerging in different parts of the country, you may need to connect with variety of audience at state capitals and tier 2/3 cities and in such situations this powerful plugin from Microsoft can make your life easier by converting your presentations into multiple local languages

- Google's Indic Keyboard can recognise Hindi handwriting. Similarly, Windows now has a Handwriting panel that too can do the trick.
- Disability, coupled with inability to use English language, multiplies the challenges that people with disability face as most accessible technologies and tools don't understand Indian languages.
- Accessible tools such as Narrator, with their ability to narrate text in Hindi, will make an empowering impact on the lives of common local language users and not just people with disability.
- Microsoft has been working with Indian languages for over two decades since the launch of Project Bhasha in 1998, allowing users to input localised text easily and quickly using the Indian Language Input tool.
- The company has recently made available the Microsoft Indian language Speech Corpus, offering speech training and test data for Telugu, Tamil and Gujarati. Microsoft also recently announced support for email addresses in multiple Indian languages across most of its email apps and services.
- Also, as part of the latest Windows update, added Tamil 99 virtual keyboard to Windows 10. Through its global Local Language Program (LLP), it provides people access to technology in their native language. This includes Language Interface Packs for Indian languages like Hindi, Kannada, Bengali, Malayalam, amongst others.

Real Time Monitoring for Development

- According to the International Telecommunication Union, in 2011 alone, there were six billion mobile subscribers—with 79 per cent of them in the developing world.
- The practice of real-time monitoring for strengthening national monitoring systems has been employed by UNICEF and government partners to strengthen health, education, water and sanitation and social protection systems around the world. As of 2019, 77 UNICEF country offices including India's are using real time approaches enabled by the use of information and communication technologies.
- Development programmes are actively embracing RTM approaches across a range of sectors; from maternal health to nutrition and water, sanitation and hygiene (WASH)-to improve planning, monitoring, and decision making efforts. During this COVID-19 response, it has become an even greater priority to invest in RTM models that adhere to physical distancing protocols.
- When implemented, RTM integration helps to:
 - Provide a monitoring platform for communities and governments to track progress towards shared goals
 - Identify supply, demand and bottlenecks in service delivery chains
 - Increase accountability of YOJANA June 2020 government to the rapid delivery of services



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- Improve service delivery to hard- to-reach communities through informing corrective measures
- Assess and educate consumers and beneficiaries on relevant knowledge, practices and attitudes.
- In 2014, UNICEF released RapidPro, a globally accessible and free open source routine data systems application that collects data via short message service (SMS) and other communication channels. It has been developed to be a 'global public good' by UNICEF and the ambition is to garner investment to encourage the buy-in of real-time monitoring systems in 110 countries by 2021.
- Real-time monitoring that allows low-touch data collection and dissemination would therefore be best in this context, as proven before during the Ebola and H1N1 outbreaks, both which had similar contact restrictions.
- As of 2019, 77 UNICEF country offices including India's are using real time approaches enabled by the use of information and communication technologies which enable faster retrieval and analysis of data and information, than paper-based or other traditional systems.
- RTM approaches are only effective where the capacity to utilise frequent data and insights is sufficient and responsive; otherwise, the approach may have a negative effect of creating extra data collection burden without commensurate response.
- Especially in countries as large, culturally and geographically diverse as India, digital tools can easily respond to many demands and challenges in social sector programming.

Covid-19 Virology

- SARS-CoV-2 and other CoVs belong to sub- family *Coronavirinae* in the virus family *Coronaviridae* comprising four genera *Alphacoronavirus*, *Betacoronavirus*, *Gammacoronavirus* and *Deltacoronavirus*.
- These are enveloped with positive sense single-stranded ribonucleic acid (RNA). The word "corona" in Latin means "garland, wreath or crown". Coronaviruses have characteristic club-shaped peplomers projecting out of the virus envelope.
- CoVs are known to infect different animal species and can cross species' barriers to cause illness in humans. Alphacoronaviruses and betacoronaviruses are transmissible to humans.
- The alphacoronavirus strains 229E and NL63, along with the betacoronavirus strains OC43 and HKU1, tend to cause only mild symptoms in humans. The betacoronavirus strains MERS-CoV, SARS-CoV and SARS-CoV-2, all can cause severe respiratory distress with mortality up to the tune of 34.4%, 9.19% and 6.8% respectively, though there may be regional differences.
- Most of the early cases had links to the Wuhan wet/ seafood market, where speculation about the animal source/ intermediate host ranged from bats, snakes and pangolins. However, to date no confirmed animal host has been identified with certainty.
- The SARS-CoV-2 virus has a diameter of approximately 50–200 nm and possesses spikes on its surface (up to 20 nm in length) that provide it the crown-like appearance under an electron-microscope Like other CoVs, the virus is sensitive to ultraviolet rays and heat. Furthermore, these viruses can be effectively inactivated by lipid solvents such as ether, ethanol, chlorine-containing disinfectants, and chloroform.
- The SARS-CoV-2 genome (29,891 nucleotides) comprises majorly of four structural proteins, i.e., nucleocapsid (N) protein that holds the viral RNA; spike (S) protein; envelope (E) protein and membrane (M) protein that create the viral envelope.
- SARS-CoV-2 enters host cells using the surface S protein to bind to the host receptors of epithelial cells in the respiratory tract. The angiotensin- converting enzyme 2 (ACE-2) has been identified as the predominant receptor for SARS-CoV-2
- Once the virus enters the host cell, the viral RNA is released into the host cell cytoplasm. Viral RNA is translated to produce polyproteins which are further cleaved to form structural proteins for the RNA replicase transcriptase complex, which is responsible for the replication and transcription of viral RNA.
- Viral nucleocapsids are assembled and bud from the endoplasmic reticulum Golgi intermediate compartment (ERGIC). As viral nucleocapsids encase viral RNA to produce new CoV virions, they are budded out.
- Genome comparison of SARS- CoV-2 showed that it had maximum (96.3%) nucleotide identity with BatCoV RaTG13 sequence, 89% identity with bat SARS-like- CoVZXC21 and 82% identity with that of human SARS-CoV. Based on this, the virus causing COVID-19 was called SARS-CoV-2. Based on this, the virus causing COVID-19 was called SARS-CoV-2.
- Animal-to-human transmission was assumed to be the main mechanism of transmission initially.
- However, noting that subsequent cases were not associated with this exposure mechanism, it was concluded that the virus could also be transmitted from human-to-human. Though symptomatic people are the most frequent source of COVID-19 spread, the possibility of transmission before symptoms develop could not be excluded.

- Viable viral particles may remain on stainless steel and plastics and other fomites for up to 72 hours after application. Aerosol transmission is also possible in case of protracted exposure to elevated aerosol concentrations in closed spaces.
- Incubation periods for SARS- CoV-2 may vary but have been known to be generally within 3 to 7 days with the median observed to be 5.1 days
- The basic reproduction number (R0), or the number of cases directly generated by one case in a population where all individuals are susceptible, has been reported to be between 2.13 and 4.82, which is similar to SARS- CoV.
- Children population seems to be the least affected by the disease, while the highest rate of death is among the elderly and people with comorbidities. Few reports have suggested an *in vivo* evolution of the virus, which may explain the rapid spread and changing epidemiology of SARS-CoV-2, but further evidence is needed.
- Initially, among countries excluding China, the countries with most cases were Italy and the Islamic Republic of Iran. The epidemiological scenario since has drastically changed. According to WHO statistics (as of 19 May, 2020), the most reported cases are in United States of America (14,77,516), Russian Federation (2,99,941), The United Kingdom 2,46,410, Brazil (2,41,080), Spain (2,31,606) and Italy 2,25,886.
- Symptoms and signs of COVID-19 may appear 2 to 14 days after exposure and can most commonly include fever, dry cough, fatigue, generalised body ache, nausea, vomiting diarrhoea and shortness of breath.
- Once SARS-Cov-2 enters the respiratory tract, it leads to infection of angiotension converting enzyme 2 (ACE2) expressing target cells such as the alveolar type 2 cells and perhaps other unknown target cells in the lungs. Cells infected with virus may escape the interferon (IFN1) produced by the host which may lead to increased virus replication in the lungs.
- The gastrointestinal symptoms of COVID-19 may be caused by direct viral damage to the intestine rather than the immune-pathogenic response to the lung infection of the host.
- There is recruitment of neutrophils, macrophages and monocytes to the release of high levels of pro- inflammatory cytokines. The “cytokine storm” leads to inflammation related lung injury. Death which is mainly seen in the elderly is finally due to multiple organ failure.
- For early diagnosis, detection of SARS-CoV-2 viral RNA is recommended. There are many assays that detect viral RNA using real-time PCR. Most screening assays detect the envelope (E) gene. If it is positive, confirmatory testing to detect other viral genes is carried out.
- Currently, there are many manufacturers of these real time PCR assays. They, however, have to be certified by regulatory agencies receiving the US Food and Drug Administration Emergency Use Authorisation (FDA-EUA) or receive Conformité Européenne (CE) marking. Other assays will have to be validated by established governmental laboratories that have been certified for testing. For viral RNA testing, nasal, throat, nasopharyngeal or oropharyngeal swabs are required.
- Several immunoassays are now available to detect IgM and IgG class of antibodies, the immune response to the virus. Most assays can detect IgM antibodies by approximately the 10th day and IgG antibodies by the 20th day post infection
- Under the circumstances of no specific treatment for COVID-19 currently, supportive care and prevention of complications is of utmost importance. Ventilator support is given for patients experiencing respiratory distress. Conservative fluid management is given as it may worsen the lung oedema, interfering with oxygen delivery. Systemic corticosteroid therapy is not recommended either, as it may delay viral clearance.
- The drug therapies can be divided into two main categories depending on their target. The first acts on the coronavirus directly, either by inhibiting crucial viral enzymes responsible for genome replication, or by blocking viral entry to the host cells. The second class of inhibitors act on the host immune system or inhibit inflammatory processes. Most of these drugs are actually being repurposed for the COVID-19 trials
- Among the ongoing drug therapy options for COVID-19 are repurposed drugs like remdesivir, favipiravir, that exhibit broad-spectrum antiviral activity as virus replication inhibitors, HIV protease inhibitors such as lopinavir and ritonavir, virus-cell membrane fusion inhibitors such as recombinant human Angiotensin-Converting Enzyme 2 (rhACE2), entry inhibitors like Arbidol (umifenovir), anti- parasitic agents such as ivermectin and anti-malarial drugs such as hydroxychloroquine
- Interferons are secreted by the virus-infected cells and recombinant interferon therapy either used alone or in combination with other drugs, is being tried as immune system enhancers.
- Among the vaccines under trial include a lipid nanoparticle-encapsulated mRNA vaccine that does not require the virus, DNA vaccine candidates, a vaccine composed of a non-replicating adenovirus vector and the genetic sequence of the S protein of SARS-CoV-2, a stabilised subunit vaccine, a nanoparticle-based vaccine using antigens derived from the CoV S protein and a genetically modified artificial antigen-presenting cells (aAPCs) expressing the conserved domains of the viral structural proteins delivered by lentivirus vector.

Migration & Economic Growth

- By the time the second phase of lockdown started, capability to 'stay home and stay safe' of about one-tenth of the population – the migrants - had worn out because they neither lived in what could be called as a home, nor were they safe inside their dwellings, given the accepted norms of social distancing and hygiene.
- The government by declaring COVID-19 as a national disaster had made it obligatory for the employers to pay the wages, as per the National Disaster Management Act.
- Harris-Todaro model of migration (1970) shows how rural/agricultural workers decide to migrate to urban/ industrial spaces when the expected wage rate in the urban- industrial sector is significantly higher than their present wages in the rural sector. The expected wage is a ratio of the present urban wage rate and the 'chance' of finding a job. The latter being a ratio of the number of jobs available, and the total number of aspirants, which includes those living in the urban sector and the new migrants. Naturally, if the 'chance' of finding a job is poor, the expected wage is low, and the decision to migrate is put off.
- But as workers began returning due to the pandemic, there was an opportunity to prepare a data base of this labour market, which is significant, given the employment potential and contribution of this sector to the GDP.
- This information is crucial to the formation of Labour Market Information System, which could be developed by compilation of information at the Labour commissioner's office.
- There is a possibility of building clusters of new MSMEs or units based on co-operatives using the skill and experience of the return-migrants. This is simply because migrants who have returned back are more likely to identify and hence tune and team up with each other.
- One can conceive of several avenues to benefit from social dialogue. Once the phase-wise return is planned, NGOs can be encouraged to participate in ensuring a safe return of migrants by collaborating with the medical personnel.
- Uttar Pradesh government has released its first skill map of migrant workers who returned to the State during the lockdown. The government has said it will provide them jobs in the State as per their skills and experience and will constitute a Migrant Commission for it.
- Alternatively, there might be a Ricardo Effect. Employers may opt for labour saving technology in response to an upward movement in the wage rate, triggered by a relative labour shortage. This, of course, is possible only if a sign of recovery is visible.
- As we move beyond Lockdown 4.0, there is a talk that 'herd immunity' might work better than social distancing. This is because virologists are warning us of a return of the virus within a year.
- So, extending lockdowns might not deliver much. In any case, following Pigou's Maximum Social Advantage principle, it would be baseless to carry on with the lockdown extension beyond its optimum. i.e. when the net benefits from lockdown have been maximised.
- Boosting the consumption demand at the earliest is the need of the hour, since consumption expenditure constitutes almost 60 per cent of India's GDP. And ensuring decent earnings to the workers in general, including the migrants can easily facilitate this, mainly because of their high propensity to consume.
- Economists have also suggested use of surplus food grain stock to help the workers tide over the immediate periods of 'coerced unemployment', to use the word coined by Prof. K.R. Sham Sundar.
- There are successful examples of migrant workers' co-operatives that emerged as a response to crisis in many countries. States can benefit by collaborating with ILO which has a rich experience of hand-holding many such projects across the globe.
- The State governments may have to work on improving infrastructure, building industrial estates, for setting up new MSMEs, etc. for such projects to become feasible.
- Nurkse (1953) wrote of the 'unlimited supply of labour' in LDCs as a 'potential source of saving', provided there was migration of the disguisedly unemployed workers from rural to the urban industrial sector. Harris and Todaro added the next leaf to the story of rural- urban migration when they explained the growth of urban informal sector due to this migration.
- Creating opportunities of gainful employment by utilising the skills the return-migrants have acquired so far, especially through co- operatives not only follows the Prime Minister's call to be 'Atma-Nirbhar' (self-reliance), but it can also facilitate decentralisation of the process of growth.

Online Learning in Lockdown

- COVID-19 has forced the teaching community to look for alternatives to maintain the continuity in the teaching learning process. The pandemic has forced all the teachers to Work from Home (WFH).

- The internet- based education depends on several factors and robust connectivity along with a better sustainable collaboration between telecom firms and streaming companies, in lowering the transmission bit rate from high definition to standard definition to develop tools that make learning truly enjoyable.
- Satellite Instructional Television Experiment (SITE) was the largest communication experiment in the use of satellite in support of developmental and educational programmes in modern times. The telecast via this satellite began in India from August 1, 1975. Indian Space Research Organisation (ISRO) with All India Radio (AIR) took the responsibility of broadcasting ETV programmes to the selected villages in six states of Andhra Pradesh, Bihar, Karnataka, Odisha, Madhya Pradesh and Rajasthan, selected on the basis of their educational backwardness.
- Based on the success of SITE, India approved a proposal to launch a multipurpose and space communication system of her own called Indian National Satellite (INSAT) in 1977. The major objectives of INSAT were to produce and transmit varied programmes designed to awaken, inform, enlighten, educate, entertain and enrich all sections of the people in different parts of the country.
- Soon, INSAT-1B was launched on August 30, 1983. About four thousand television sets were installed and commissioned. These television programmes were telecast in the morning and evening.
- India's space programmes took another big leap on July 24, 1993 when the multi- functional indigenously built satellite INSAT-2B launched into space from French Guyana in South America. Prior to this broadcast of IGNOU's educational programmes began in May 1991 on the national network of Doordarshan thrice a week in the early morning.
- The IGNOU programmes are syllabus-based and cater to the learners enrolled in IGNOU programmes. These programmes supplement the self-instructional texts provided to the students of the university. These broadcasts mark a major step in the progress of IGNOU in fulfilling its educational objectives and in the country's development.
- Gyan Darshan (GD) came into existence on 26th January 2000; it is an exclusive and dedicated twenty-four hour educational and developmental TV channel of India, set up as the joint collective venture. It has expanded into a bouquet of channels namely GD-1, GD-2, GD-3 Eklavya, and GD-4 Vyas. The primary target audiences of the channel are the students studying in undergraduate and postgraduate classes in universities and colleges all over the country, particularly in small towns.
- Electronic Media Production Centre (EMPC) of IGNOU has been identified as the coordinating and transmission agency.
- On September 20, 2004, EDUSAT- the dedicated satellite for education in India was launched by ISRO. It is the first Indian satellite exclusively built for the use of education sector. The satellite is capable of providing high bandwidth two-way interaction by creating a private network of Satellite Interactive Terminals (SITs) and Receive Only Terminals (ROTs) installed all over the country.
- As per the report of TRAI, only 34 per cent of the total population had access to the Internet in 2017. The figure carries a vast gender disparity, where the ratio of male and female users is approx. 70 per cent and 30 per cent respectively.
- A whopping 66 per cent of the total population lives in rural India. Still, it accounts for just 25.3 per cent internet density compared to the 34 per cent of the urban population having around 98 per cent internet connectivity. As per the March 2020 trends of the Speedtest Global Index, India ranks at 130 out of 141 nations with a download speed of 10.15 Mbps compared to the global average of 30.47 Mbps.
- UGC Regulation 2016 mandates that institutions should provide 20 per cent of total course through online platform SWAYAM. The 75th round of NSSO Survey showed that 8.3 per cent of households had computers and 21.6 per cent had internet facility. Further, a larger share of households had access to internet facility versus ownership of computers.
- The Indian youth are sometimes characterised by limited digital skills. Only 17.6 per cent of the youth could use a computer and 18.4 per cent could access internet.
- The current crisis has acted as a fillip to encourage digital education. It is equally important here to look for the judicious mix of Open Educational Resources (OER) along with delivery of education via television/satellite. OER is the teaching, learning and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use. It may include full courses, modules, text books, streaming videos, tests etc. The 2012 OER Paris Deceleration provided the broader guidelines on how to make best use of OER.
- Providing equity in access of bandwidth and technology among the majority of the remote learners in country is going to be the biggest challenge besides the immediate availability of adequate numbers of trained manpower (both the content & technical experts).

eNAM: Platform for Marketing

- National Agriculture Market (eNAM) is a highly ambitious and successful scheme of Government of India which networks the existing APMC mandis to create a unified national market for agricultural commodities with a vision to promote uniformity in agriculture marketing by streamlining of procedures across the integrated markets, removing information asymmetry between buyers and sellers and promoting real time price discovery based on actual demand and supply. It was launched in April 2016.
- Small Farmers Agribusiness Consortium (SFAC) is the lead agency for implementing eNAM under the aegis of Ministry of Agriculture and Farmers' Welfare, Government of India.
- It offers a "plug-in" to any market yard existing in a State (whether regulated or private). The special software developed for eNAM is available to each mandi which agrees to join the national network free of cost with necessary.

KISAN SABHA APP

- Kisan Sabha App has been developed by CSIR- Central Road Research Institute (CSIR-CRRI), New Delhi to connect farmers to supply chain and freight transportation management system. It aims to provide the most economical and timely logistics support to the farmers and to increase their profit margins by minimizing interference of middlemen and directly connecting with the institutional buyers.
- The portal acts as a single stop for every entity related to agriculture, be they a farmer who needs better price for the crops or mandi dealer who wants to connect to more farmers or truckers who invariably go empty from the mandis.
- It works for people in agriculture services sector such as dealers of fertilizers/ pesticides, who can reach out to more farmers for their services.
- It would also prove to be useful for those associated with cold store(s) or godown(s). KisanSabha also provides a platform for people who want to buy directly from the farmers.

MSME Champions

- The Union Ministry of MSME has launched CHAMPIONS portal www.champions.gov.in, a technology-driven Control Room-Cum-Management Information System. The system utilising modern ICT tools is aimed at assisting Indian MSMEs march into big league as National and Global Champions.
- The CHAMPIONS stands for Creation and Harmonious Application of Modern Processes for Increasing the Output and National Strength. The portal is basically for making the smaller units big by solving their grievances, encouraging, supporting, helping and handholding.
- It is a technology packed control room-cum- management information system. In addition to ICT tools including telephone, internet and video conference, the system is enabled by Artificial Intelligence, Data Analytics and Machine Learning. It is also fully integrated on real time basis with GOI's main grievances portal CPGRAMS and MSME Ministry's own other web-based mechanisms. The entire ICT architecture is created in house with the help of NIC in no cost.
- As part of the system a network of control rooms is created in a Hub & Spoke Model. The Hub is situated in New Delhi in the Secretary MSME's office. The spokes will be in the States in various offices and institutions of Ministry.

Fighting COVID-19 Through Innovation

- Defence Research and Development Organisation (DRDO) premier lab, `Research Centre Imarat (RCI), has developed an automated contactless UVC sanitisation cabinet, called Defence Research Ultraviolet Sanitiser (DRUVS). It has been designed to sanitise mobile phones, tablets, laptops, currency notes, cheque leafs, challans, passbooks, paper, envelopes, etc.
- It provides 360 degree exposure of UVC to the objects placed inside the cabinet. Once the sanitisation is done, the system goes in sleep mode hence the operator need not wait or stand near the device.
- The RCI has also developed an automated UVC currency sanitising device, called NOTESCLEAN for sanitising the loose notes.
- DRDO) has also developed an Ultra Violet (UV) Disinfection Tower for rapid and chemical free disinfection of high infection prone areas. The equipment named UV blaster is a UV based area sanitiser designed and developed by Laser Science & Technology Centre (LASTEC), the Delhi based premier laboratory of DRDO.
- The UV Blaster is useful for high tech surfaces like electronic equipment, computers and other gadgets in laboratories and offices that are not suitable for disinfection with chemical methods.

R&D Expenditure & Scientific Publications

- The country's gross expenditure in R&D has tripled between 2008 & 2018 driven mainly by Government sector and scientific publications have risen placing the country internationally among the top few. This is as per the R&D Statistics and Indicators 2019-20 based on the national S&T survey 2018
- The Gross expenditure on R&D (GERD) in the country has been consistently increasing over the years and has nearly tripled from Rs. 39,437.77 crore in 2007- 08 to Rs. 1,13,825.03 crore in 2017-18.
- DST and DBT were the two major players contributing 63% and 14%, respectively of the total extramural R&D support in the country during 2016-17.
- Women participation in extramural R&D projects has increased significantly to 24% in 2016-17 from 13% in 2000-01 due to various initiatives undertaken by the Government in S&T sector.
- Number of researchers per million population in India has increased to 255 in 2017 from 218 in 2015 and 110 in 2000.
- India occupies 3rd rank in terms of number of Ph. D.'s awarded in Science and Engineering (S&E) after USA (39,710 in 2016) and China (34,440 in 2015).

S&T Based Innovative Solutions

- A large number of citizens have participated in the Challenge COVID-19 Competition (C3) and helping the country come out of this crisis through Science and Technology based innovative solutions.
- NIF is providing incubation and mentoring support for further dissemination to the generator of the ideas. A foot-operated device for hand sanitisation and washing and an innovative sprayer for sanitization are the two recently supported innovations under the campaign.

GOAL' Programme for Tribal Youth

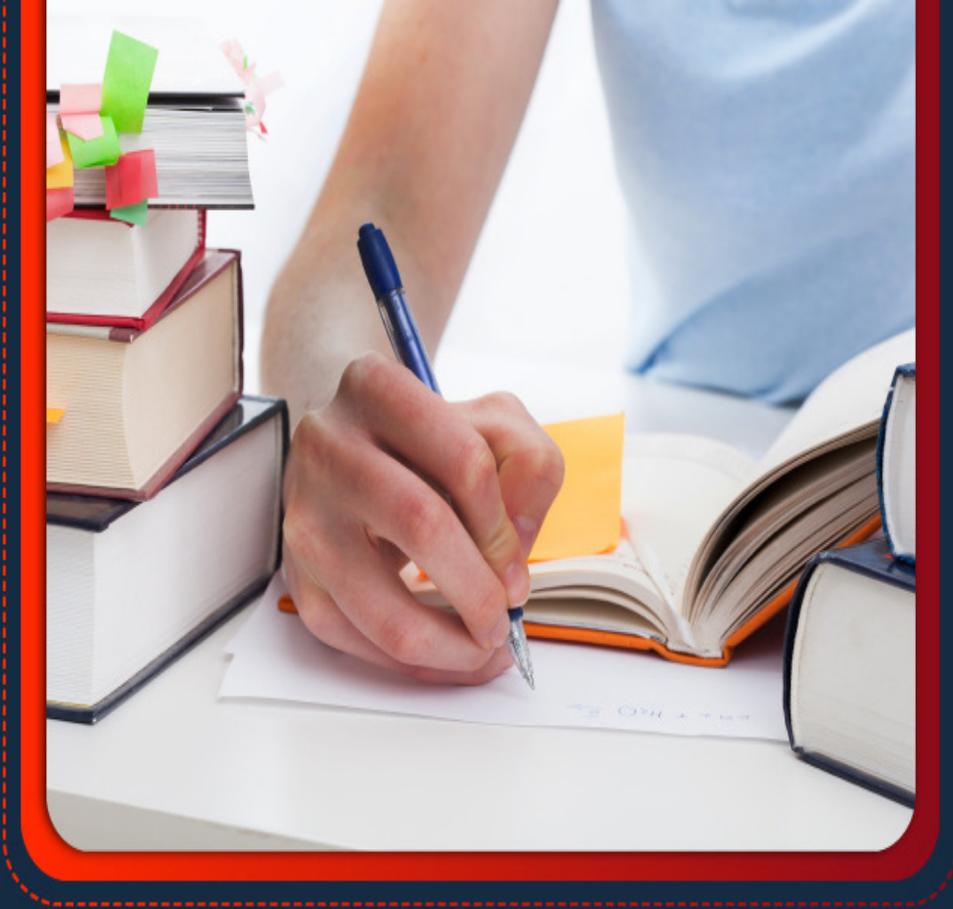
- The Ministry of Tribal Affairs has launched the GOAL program in partnership with Facebook. The programme is designed to provide mentorship to tribal youth through digital mode. The digitally-enabled program envisages to act as a catalyst to explore hidden talents of the tribal youth, which will help in their personal development as well as contribute to all-round upliftment of their society.
- 5,000 young tribal entrepreneurs, professionals, artisans and artists will be trained on digital skills under digital entrepreneurship program
- The mentees and mentors will be selected based on their inputs in such a way that it represents tribal youth from varied professions and has representation from urban and rural area across India. The IT based system is designed to match mentors and mentees
- The selected mentees will remain engaged in the program for nine months or 36 weeks comprising of 28 weeks of mentorship followed by eight weeks of internship. The program will focus on three core areas – Digital Literacy, Life Skills and Leadership and Entrepreneurship, and on sectors such as Agriculture, Art & Culture, Handicrafts & Textiles, Health, Nutrition, among others.

SWASTH VAYU

- CSIR-National Aerospace Laboratories (NAL) Bangalore, a constituent of lab of CSIR has developed a Non Invasive BiPAP Ventilator in a record time of 36 days to treat COVID-19 patients. BiPAP Non- Invasive ventilator is a microcontroller-based precise closed-loop adaptive control system with a built-in biocompatible “3D printed manifold & coupler” with HEPA filter (Highly Efficient Particulate Air Filter).
- It is externally connected Oxygen concentrator will be ideal to treat moderate or mid-stage severe COVID-19 patients who do not require intubation and invasive ventilation.

Tropical Cyclones

- Tropical cyclone Amphan intensified rapidly in the Bay of Bengal to become a “Super Cyclonic Storm” – the equivalent of a strong Category 4/weak Category 5 on the Saffir Simpson scale.
- Tropical cyclones can last for a week or more; therefore there can be more than one cyclone at a time. Weather forecasters give each tropical cyclone a name to avoid confusion. Each year, tropical cyclones receive names in alphabetical order. Women and men's names are alternated.
- The name list is proposed by the National Meteorological and Hydrological Services (NMHSs) of WMO Members of a specific region, and approved by the respective tropical cyclone regional bodies at their annual/ bi-annual sessions. Nations in the western North Pacific began using a new system for naming tropical cyclones in 2000.



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