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DIGITAL INDIA

DECEMBER, 2020

Digital India

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GIST OF KURUKSHETERA

DIGITAL INDIA

DECEMBER, 2020

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Digital India

INTRODUCTION

- **'Digital India'** is a flagship programme of the Government of India with a vision to **transform India into a digitally empowered society and knowledge economy** and enables its citizen to access and avail the government services electronically and with ease-of-use.
- To uplift rural economy, this digitalisation drive needs to be expanded equally in **rural India** with **services in e-governance**, **banking**, **financial**, **education**, **healthcare**; and services along with mobile, DTH recharge, e-ticketing, online shopping.
- **National Digital Health Mission (NDHM)** is also one of the landmark initiatives of the government, adhering **global best practices** for embracing digital solutions. Under this scheme, user's **health account** is created with details of all diagnostic-tests, diagnosis of diseases/disorders, doctors' consultation, medicines prescribed and progress achieved, etc. This digital-information is significantly useful, as It is **portable, easily-accessible anywhere but safe-secure as well**.
- Indian economy's growth prospective lies in adoption of digitalisation technologies for empowering **agriculture, rural sector, agri-food value chain** and **processed-food industry**.

REALISING 'DIGITAL INDIA' THROUGH ITS DIFFERENT PILLARS

- **Digital India is a flagship programme of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy**. The **vision areas** under this programme, as delineated by the Ministry of Electronics and Information Technology, include '**Digital Infrastructure as a Core Utility to Every Citizen**', '**Governance and Service on Demand**' and '**Digital Empowerment of Citizens**'.
- Under this programme, the government aims to provide **high speed internet connectivity** across the length and breadth of the country. In addition, it also aims to establish and leverage the **unique identity (Aadhar) as a mode to ensure digital identity, financial inclusion, and easy access to the Common Services Centres (CSCs).**
- The Digital India Progamme took one step ahead and aspired to provide **seamlessly integrated services across departments or jurisdictions by adopting a single window framework**. It also promotes the **use of Open source and Open API**, to ensure interoperability of all e-governance applications and provide access to data and services for promoting participation of citizens. The **Unified Payments Interface** could be considered a pathbreaking development, which is an **example of open-source application** and proved to be a pivotal step for India towards becoming cashless.

Pillars of Digital India

Broadband Highways

- This pillar has **three components including Broadband for rural, Broadband for urban and National Information Infrastructure**.
- Over 2,00,000 village panchayats are being brought under the ambit of the **National Optical Fibre Network under the Broadband for Rural project.**
- Under the Broadband for Urban project, the Ministry aims to utilise Virtual Network Operators for service delivery and communication infrastructure.
- The National Information Infrastructure aims to integrate India's Network and cloud infrastructure to facilitate high speed connectivity as well as cloud platform for different government entities.

Universal Access to Mobile Connectivity

- Under this pillar, the Ministry aims to connect **over 50,000 villages** which do not have mobile coverage, with an aim to bridge the digital divide.
- **Department of Telecom** has been assigned as the **Nodal Agency** for this project.

Public Internet Access Programme

- It aims to establish the **infrastructure mechanisms** for enabling access to public internet for the common people.
- The Public Internet Access Programme focused mainly **two components including CSCs and transforming Post Offices as multi-service centres**.
- Under the Digital India programme, the Ministry under the CSC 2.0 project aims to establish a self-sustaining network of 2.5 lakh CSC centres at gram panchayat level.
- Around 150,000 post offices are proposed to be converted into multi service centres and this project is being driven by the Department of Posts.

- **E-Governance – Reforming government through Technology**
  - Under this pillar, the government has different focus areas including form simplification and form reduction, online applications and tracking, online repositories and integration of services and platforms.
  - The Digital India programme, under this pillar, has also **established the Traditional Development of Indian Languages Programme**, to facilitate human-machine interactions in Indian languages.
- **E-Kranti, Electronic delivery of Services**
  - Under this pillar, the Digital India programme has identified **44 mission mode programs which have been grouped under Central, State and Integrated projects**.
  - The major focus areas includ**e banking, income tax, transport, commercial taxes, financial inclusion** andso on.
- **Information for All**
  - This pillar aims to ensure **transparency** and **availability of reliable data** generated by the line ministries for use, reuse and redistribution for the people of India.
  - The**Mygov platform** is a significant step towards ensuring governance and promoting government-citizen interactions.
- **Electronic Manufacturing**
  - Due to the high capital and operational expenditure, electronics manufacturing in India has not taken off. The Ministry has been trying to change this scenario by bringing policy interventions to draw global interest for electronics manufacturing in India.
  - The major **focus areas** under this pillar include **FABS, Fab-Iess design, Set top boxes, VSATs, Mobiles, Consumer and Medical Electronics, Smart Energy meters, Smart cards** and **micro-ATMs.**
  - The recent policies including **Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS**), **Production Linked Incentive Scheme (PLI)for Large Scale Electronics Manufacturing** and the **Modified Special Incentive Package Scheme (M - SIPS)** have been monumental in strengthening the electronics in India.
- **IT for Jobs**
  - This pillar focuses on skill development of the Indian youth in rural and urban areas for making them skilled for the IT/ITeS sector.
  - The **North East BPO Scheme** has been established to bring the focus of the BPO industry to the Tier-1 cities to the Northeastern states.
- **Early Harvest Programmes**
  - The major projects under this pillar include **IT platform** for mass messaging, crowd Sourcing of eGreetings, biometric attendance in the government offices, WI-FI in all universities, secure email within government, standardise government mail design, public Wi-Fi hotspots, Schools books to be eBooks, SMS based weather information/ disaster alerts and national portal for lost and found children

Implementation

- The **Ministry of Electronics and Information Technology** has been the nodal agency for several projects, **along with the Department of Telecommunications** to ensure time-bound implementation of different projects under aforementioned pillars.

- The existing schemes are expected to be restructured, revamped and re-focused, to confirm alignment to the objectives of the Digital India Programme.

Challenges

- **Technical Challenges**
  - Integration and alignment of different networks, interfaces/ platforms across different states.
  - With a huge chunk of state and central government functioning on legacy systems, interoperability has been a major concern.
  - **Digital illiteracy** has prevented the effective utilisation of the projects.
  - **Digital infrastructure** would be more exposed to privacy and security threats.
- **Organisational Challenges**
  - Lack of highly **skilled individuals**
  - Huge **population**
  - Presence of **different languages**
  - **Distributed control of subject between the state and the center**
- **Economic Challenges**
  - **Limited project funding**
  - Scale of the Digital India programme **warrants huge budget outlay**.
  - **COVID-19 has posed issue** as it has disrupted the multitude of ongoing projects proving to be a huge setback for the entire programme.

Way Forward

- Improving the Regulatory Framework
- Effective Implementation of Projects
- Optimisation of Resources
- Bridging the Digital Divide
- Driving Inclusive Participation in Projects

TOWARDS "SARVE SANTU NIRAMAY" - INDIA'S E-HEALTH REVOLUTION

- What is **eHealth?** According to **World Health Organisation (WHO)**, it is **defined as: "...the cost-effective and secure use of information and communication technologies in support of the health and health-related fields including healthcare, health surveillance and health education, knowledge and research."**
- **G Eysenbach** has identified the "**10 e's in eHealth**". These are **efficiency, enhancing quality, evidence-based, empowerment, encouragement, education, enabling, extending of scope, ethics,** and **equity.**

National Digital Health Mission (NDMH)

- **National Digital Health Mission is holistic, voluntary healthcare programme which will integrate doctors, hospitals, pharmacies, insurance companies and make a digital health infrastructure.**
- **Under this scheme, Health 10 will be given to every Indian**. This health account will contain details of every test, every disease, the doctors visited, the medicines taken and the diagnosis.
- This information will be very useful as it is portable and easily accessible even if the patient shifts to new place and visits a new doctor.

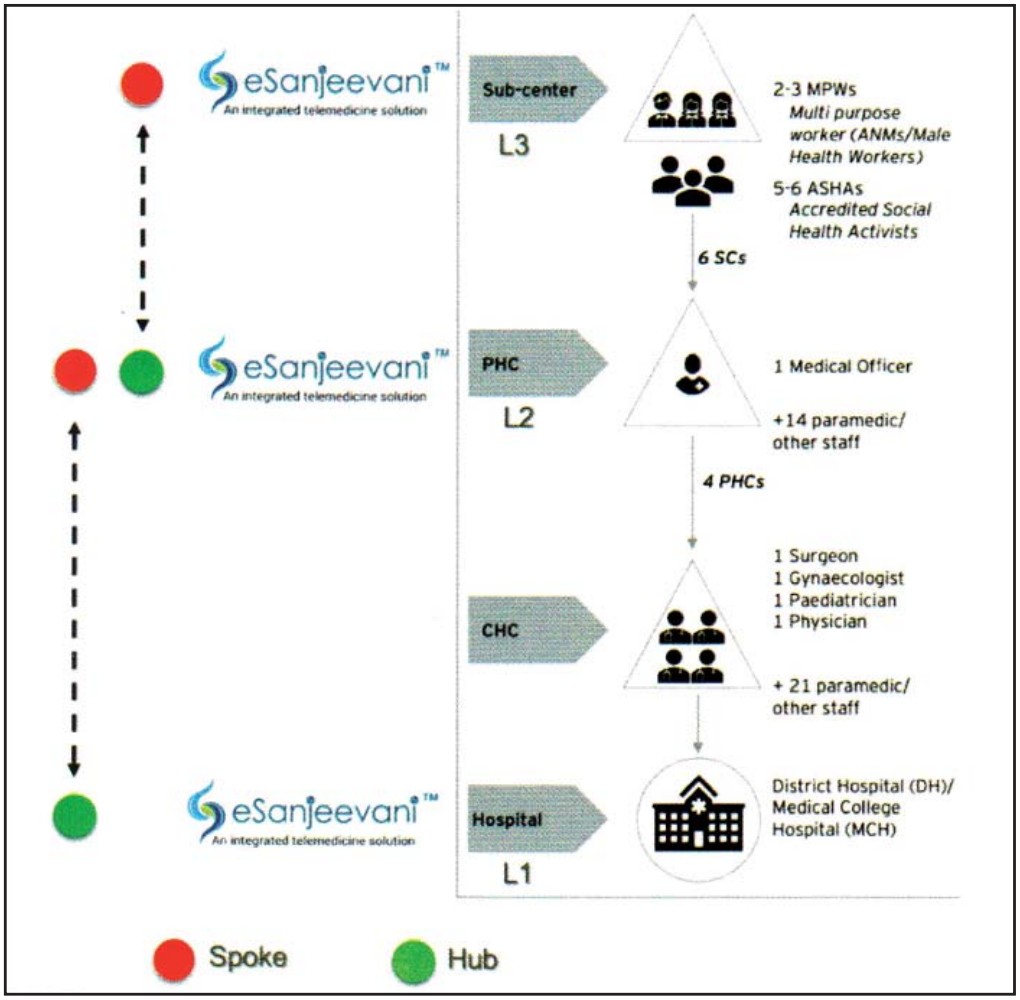
The National Digital Health Blueprint envisages achievement of the following objectives:

- To establish state-of-the-art digital health systems
- To establish National and Regional Registries
- To enforce adoption of open standards
- To create a system of Personal Health Records
- To promote development of enterprise-class health application systems
- To ensure National portability
- To promote the use of Clinical Decision Support (CDS) Systems

Other eHealth Initiatives

- **National Health Portal-NHP** by the **Health Ministry** provides **information to citizens and stakeholders** to create awareness amongst the citizens about health Government programmes and services in Health Sector.
- **E-Hospital@NIC** is **Hospital Management System,** is a workflow based ICT solution for hospitals specifically meant for the hospitals in the Government Sector.
- **Online Registration System (ORS),** launched in 2015 provides services to citizens for taking online registration & appointment, payment of fees, online viewing diagnostic reports, enquiring availability of blood online etc. In various public hospitals.
- **'MeraAspatal'** is a **Health Ministry initiative to capture patient feedback for the services received at the hospital** through user friendly multiple channels such as short Message Service (SMS), mobile application, etc.
- **"SUGAM"** is a **"single window" platform for multiple stakeholders involved in CDSCO such as Pharma Industry, Regulators, and Citizens.** It enables online submission of applications, their tracking, processing & grant of approvals online mainly for drugs, clinical trials, ethics committee, medical devices, vaccines and cosmetics.
- **PMSMA Mobile App** for reporting pregnancy care related information from across the states **under Pradhan MantriSurakshitMatritvaAbhiyan.**
- **Health Management Information System (HMIS)** is a web-based portal for **monitoring the programmes under National Health Mission (NHM).**
- **Mother and Child Tracking System (MCTS)/ Reproductive Child Health (RCH) Application** is an individual-based tracking system to facilitate **timely delivery of antenatal and postnatal care services and immunization to children** with an objective of improving IMR, MMR, & morbidity.
- **Kilkari**delivers free, weekly, time-appropriate 72 **audio messages about pregnancy, child birth and child care** delivery to families' mobile phones.
- **TB Patient Monitoring System "Nikshay"** tracks individuals for treatment-adherence.

- **Tobacco Cessation Programme** is a **mobile-based** interventional initiative for **counselling** and helping people to quit tobacco.
- **Hospital Information System (HIS)** is being implemented in hospitals for automation of hospital processes to achieve better efficiency and service delivery in Public Health facilities upto CHC level.
- **e-RaktKosh** is a **comprehensive, efficient and total quality management approach with the help of online systems** and is being rolled out for all the licensed blood banks in public and private health facilities.
- **e-Sanjeevani: Transforming the Medical Landscape,** it is a digital platform for **provisioning of health services**. Rapid adoption of **eSanjeevaniOPD** across the country has accelerated the launch of a wide range of speciality and super-speciality OPDs.



- **eVIN (Electronic Vaccine Intelligence Network)** is aimed at **strengthening immunisation supply chain systems in India.** It aims to provide real-time information on vaccine stocks and flows, and storage temperatures across all cold chain points in the country.

STURDY PROGRESS IN RURAL E-GOVERNANCE

- **Information and Communication Technologies (ICTs)** have emerged as a vehicle to bring people together and deliver services at the peoples' doorsteps, irrespective of where they live. The Government of India has prioritised a largescale implementation of e-Governance projects in the country.
- Since a large part of India's population lives in villages, **it is crucial that our e-Governance model makes sure that it is accessible to the rural masses in the country.**

- E-Governance is the mechanism for providing and managing government services via electronic means and is expected to help in ensuring a **SMART (Simple, Moral, Accountable, Responsible and Transparent) government**.

Digital India and e-Governance

The **guiding principles** for reforming Government through technology are:

- **Form Simplification and Field Reduction** - only minimum and necessary information should be collected.
- **Online Applications and tracking**
- **Online Repositories**
- **Integration of Services and Platforms** e.g., Aadhaar platform of Unique Identity Authority of India (UIDAI), payment gateway.
- All **databases and information should be in electronic form** and not manual.

National e-Governance Plan

- **Department of Electronics and Information Technology (DEIT)** and **Department of Administrative Reforms and Public Grievances (DAR&PG)** came together to make it a reality.
- **Rural citizens were the priority target for NeGP** and **State Wide Area Network (SWAN)** and **Common Service Centres (CSCs)** were set up to meet that objective.
- NeGP ensured that schemes and initiatives run by various arms of governments at centre, state and local level navigate in a well-defined direction and follow a common approach, vision and strategy.
- Today, **India is the second-largest telecom market worldwide**. **The number of mobile subscribers in India amount to around 1.15 billion.**
- This effectively handles the problem of limited PC penetration in the country as smart mobile devices have emerged as a convenient alternative to computers when it comes to using ICT based services.
- The **ultimate objective is to bring public services closer home to citizens as articulated in the Vision Statement of NeGP.**

Some e-Governance Projects

- **E-Panchayats:** The project, **developed by NIC,** provides a host of services including information on topics such as agriculture, irrigation, fisheries, loans, seeds, fertilisers etc. They provide services like various taxes, death and birth certificates, pensions, and approvals for building constructions.
- **Bhoomi:** A **Karnataka government initiative**, Bhoomi has been instrumental in **digitisation of land records**.
- **E-Choupal:** This is a **private sector project, launched by ITC limited to address various requirements of farmers, including selling their produce directly to the buyers, and ruling out the role of middlemen in the process.**

Limitations of Rural India

- The biggest limitation is related with **infrastructure**; especially telecom/broadband infrastructure and power supply related infrastructure.
- A large number of people in rural areas still use **feature phones** which limit their ability to access services electronically.

- **Literacy rate among the rural population is 67.67 percent**. While male literacy rate stands at 77.15 percent, female literacy rate (57.93 percent) is even less in these areas. This is in contrast to urban literacy rates where male literacy rate stands at 88.76 percent and female literacy rate at 79.11 percent.
- In rural areas, an **extremely limited number of people understand English which is the primary language of interaction on e-Governance platforms.** This seriously hinders peoples' ability to take advantage of the system.

Common Service Centers

CSC Guidelines envisage a wide variety of content and services that could be offered as listed below:

- **Agriculture Services** (Agriculture Horticulture Sericulture, Animal Husbandry, Fisheries, Veterinary)
- **Education and Training Services** (School, College, Vocational Education, Employment, etc.)
- **Health Services** (Telemedicine, Health Checkups, Medicines)
- **Rural Banking and Insurance Services** (Microcredit, Loans, Insurance)
- **Entertainment Services** (Movies, Television)
- **Utility Services** (Bill Payments Online bookings)
- **Commercial Services** (DTP, Printing, Internet Browsing, Village level BPO)

Effectiveness of the ICTs

- First of all, **Internet virtually rules out need for administrative infrastructure** and local resources which are otherwise a necessary component of government offices providing citizen services.
- An important aspect to consider is, a large part of this infrastructure has been developed by **private players.**
- The main pre-requisite here is the basic Internet/telecom infrastructure. Through the National Fiber Optic Network (NFON), the Union Government is already a long way forward in this direction.
- ICTs contribute in making sure government services are available in a **transparent and accountable manner**. This is an inclusive, bidirectional system where rural population has liberty to reach out to the government with their complaints and grievances.
- The **e-Governance contributes in eradicating corruption** as there is **no middleman involved** in the process of deliver and receipt of services. It also helps in reducing red tapes and bureaucratic hurdles, and improving efficiency.
- We have made significant progress in terms of establishing e-Governance structures. There is realisation across the government that **e-Governance can be a key enabler towards attaining the goal of Simple, Moral, Accountable, Responsible and Transparent (SMART) governance, and is going to remain a priority area for Central and State Governments**.

E-LEARNING: ACCESS AND SCOPE OF DIGITAL EDUCATION

- There has been a ceaseless march for accelerating the pace of digital education and remote learning initiatives across India in general and rural India in particular.
- **The Central Government along with State/ UT Governments has been constantly working towards socio-educational reforms through diverse programmes of digital education and virtual learning**.

Digital Education: Concept and Pedagogy

- Contemporary **COVID-19 pandemic has yielded the effect of fast-tracking digital initiatives particularly in rural India**.
- Generally, **digital education** is considered as a type of education and learning that is **"accompanied by technology or by instructional practice that makes effective use of technology.**
- **It encompasses the application of a wide spectrum of practices including blended and virtual learning"**.
- Use of mobile technologies, and other digital devices have accelerated the pace of digital education and digital learning.

Related Terminologies of Digital Education in Rural India

- **Online Learning**: Online learning is the learning by accessing available online resources. Thus, it is associated with the provision of electronic contents available on a computer/mobile device.
- **Web-based Learning**: Web-based learning refers to the process and practice of learning by using web browsers.
- **E-Iearning:** E-Iearning is the process of using electronic technologies for teaching-learning processes in which the learning activities take place either entirely or partially online. They can be conducted by means of electronic media without the use of the Internet.
- **Blended Learning:** Blended learning generally combines virtual learning with traditional classroom learning. An example of blended learning is the flipped classroom where online activities are completed outside the classroom providing an opportunity for more in-depth discussion during the face-to-face time spent in classes.
- **Virtual Learning:** Creating virtual classrooms for rural and remote communities of the country is the need of the hour.
  - Virtual learning is a learning strategy
  - Remote access to an unlimited array of educational services worldwide
  - Virtual classrooms and learning situations
  - Individualised learning process
  - Use of different learning styles
  - Safe and secure learning environment.
  - Flexible learning in terms of time, location, and pac.
  - Cost-effective and time-effective, etc.

Pedagogy of Rural Digital Education

- **Pedagogy** is the **art and science of teaching.** In a broader perspective, digital education is applied to enhance the learning experience rather than replace traditional methods.
- **Access and Scope**
- As per the provisions of the **Right of Children to Free and Compulsory Education Act, 2009** and its subsequent Amendments, **it is important to ensure equity in education with equal access to quality teaching and learning along with innovative use of resources.**
- In the present scenario of COVID-19 and educational development of rural India, students, teachers, parents and community members are open to access the varied interventions of digital education and virtual learning.

Innovative Digital Education Initiatives

- **DIKSHA-Digital Infrastructure for Knowledge Sharing**, launched in **2017**, is a national platform for school education **to address the challenge of remote learning especially in rural areas.** It is available for all the learners of grades 1 to 12 and it can be accessed through a **web portal** and **mobile application**. Salient features include:
  - Autonomy and choice within a national framework
  - Online-offline and varied types of devices
  - Diversity of content and energized textbooks
  - Data provides the ability to see and empower
  - Local language content and open licensing framework
  - Bridging the physical and digital world
  - Diversity, flexibility and evolving, etc.
  - **ePathshala**is a joint initiative of **Ministry of Human Resource Development (MHRD)**, Government of India and **National Council of Educational Research and Training (NCERT)**, New Delhi for the purpose of '**showcasing and disseminating all educational e-resources including textbooks, audio-video resources, periodicals and a variety of other digital resources**'.
  - **SwayamPrabha Channels:** Through **32 channels** earmarked for school education and higher education separately, high quality educational programmes are telecasted by the MHRD and the same are open for people of rural India for accessing remote digital learning.
  - **NROER-National Repository Educational Resources** is a collaborative platform for sharing of open educational resources. **NROER hosts large number educational resources in many subjects and in different Indian languages for Primary, Secondary and Senior Secondary classes.**
  - **ICT Scheme under Samagra Shiksha**has integrated the efforts of **Computer Aided Learning(CAL)** of**SarvaShikshaAbhiyan (SSA)** with the ICT interventions of **Rashtriya Madhyamik Shiksha Abhiyan (RMSA)**
  - **Shaala Darpan**is an e-Governance platform **for all Kendriya Vidyalayas.**
  - **Shaala Siddhi** also known as The **National Programme on School Standards and Evaluation (NPSSE)** enables the schools to evaluate their performance and thereby bring improvement.
  - **E-Granthalaya**is an **integrated Library Management Software** developed by **National Informatics Centre (NIC)**
  - **Digital Saksharta Abhiyaan (DISHA)** to impart **IT training to people including Anganwadi workers, ASHA workers and authorised ration dealers** in all the States/UTs across the country.
  - **Pradhan Mantri Gramin Digital Saksharta Abhiyaan (PMGDISHA):** The major focus is to 'bridge the digital divide, specifically **targeting the rural population** including the marginalized sections of society.
  - **Role of UNISED:** Similar efforts have been made by **UNISED INDIA** for implementing various digital initiatives particularly in rural India that includes **Low Cost and No Cost e-Resources, Solar Energy Operated Smart Classes, Projector Based Learning, Computer Aided Learning, ICT Integrated Education, Formation and Use of Professional Learning Groups, Capacity Building on Early Grade Pedagogy and Virtual Learning and unique interventions under RashtriyaAvishkarAbhiyan (RAA)**.

Conclusion

- India is moving towards becoming a global knowledge super power in which educational technology, digital initiatives and virtual classrooms play prominent roles especially for the people of rural and

remote India. Hence, digital education and virtual learning need to be the essential prerequisites of most of the rural development programmes.

PRECISION AGRICULTURE AND IOT-BASED SOLUTIONS

- Indian agriculture is on the path of transformation in the last four decades. The necessity for evolving new agri-models in India has become the necessity, given its unique characteristics and typical diversity.
- **India is primarily a rural-based economy, where over 60 percent of population still relies on agricultural and rural systems, as the primary source of income for their livelihoods.**
- The Government of India has an envisioned target of achieving US$ 5.0 trillion economy by 2024. One such mechanism for rural empowerment is extensive usage of '**Precision Agriculture**' (PA) and '**Internet of Things**' (IoT) based solutions in variety of farming systems in India.

The Need for 3rd Tech-Revolution in Agriculture

- The '**1st Agricultural Revolution' was focused on mechanisation of agriculture (1900-1940s), The '2nd Agricultural Revolution' was directed towards Green Revolution in Agriculture (1960-1990s)**, The **'3rd Agricultural Revolution**' (1990s onwards) has to dive deep and with a focus on adoption of hi-end technology, cloud-based solutions, data-driven decision making in agricultural/farm management systems, usage of analytical tools for post-harvest and marketing of agricultural produce, etc.
- The third wave of agricultural revolution is essential for India, especially given the hard realities that the **Indian population is projected to be 1.50 billion (2030) from the current 1.37 billion, where the food production has to be doubled (United Nations Report, 2020).**
- **Precision Agriculture and its Significance**
- The '**Precision Agriculture' (PA)** which is also referred alternatively as '**precision farming**', or '**site-specific crop management**', or '**prescription farming**'. The **PA comprises the observation, measurement, and analysis of the needs of individual fields of farmers and crops in the regions, so that the productivity and farmers' income are significantly enhanced.**
- The PA extensively uses the technology-driven solutions for managing the entire set of '**Agricultural Management Systems (AMS)'** for various interventions like:
  - Generating the on-site/on-farm data on continuous basis.
  - Using remote sensing, **geographic information systems (GIS), global positioning systems (GPS)**, and robotics & analytics for data-driven decision making in farm management.
  - Enhancing the **Good Management Practices (GMPs)** in agriculture, where technology play roles to reduce the farm-input-costs and simultaneously improving the agricultural productivity.
  - Using **drones** for spraying pesticides, insecticides, etc.
  - Equipping the agricultural-farmers with weather patterns and market intelligence information systems.

Benefits of Adopting Precision Agriculture

- Adopting the improved set of agricultural production practices and **choice of crops**, based on **suitability of localised lands and climate**
- **optimising the input-resources** like water, fertilisers, plant-protection measures against pests-diseases

- helping to **minimise/avoid the wastages,** by technological interventions
- managing the water and soil nutrients for agriculture effectively
- eliminating the risk and volatility in crop-production-systems
- increasing the **farmers-income**

The Indian Scenario

- The IoT is one of the most promising techniques to achieve precision agriculture, which is expected to increase agricultural yields significantly.
- The **Knowledge Acquisition framework** focuses on collating information from variety of sources, then making meaningful **data driven decisions in real-time basis**, to address the challenges agricultural farms.
- This IoT-based solution involves **enhancing automation** and reducing the manual farm management practices so that farmers leverage the advantages of IoT-technologies.
- Prediction models are developed/used by taking temperature, humidity and moisture levels of the soil, for each crop on the farm, and water is irrigated only when required.
- Implementation of IoT-based solutions in agriculture/precision agriculture are encountering challenges, like **huge initial investments in IoT-systems for PA and non-tech savvy farmers** in India.

Role of Stakeholders in Precision Agriculture

- Enabling the formulation of **precision agriculture policies** by **Government of India** and **State Governments** across India.
- Creating the **awareness among Indian farming community** about the benefits of precision agriculture.
- Demonstrating the multiple-benefits of PA, through **Central/State Agricultural Universities (CAUs/ SAUs), Central Agricultural Research Institutions**.
- Ensuring the availability of **adequate and timely agricultural credit** for the newer technologies of PA/ IoT-solutions.
- Adopting and innovating the newer PA-technologies suitable to Indian context.

Challenges in Adopting Precision Agriculture

- The information technology **infrastructure systems** and service facilities oriented to agricultural sector (which are locally accessible, cost-effective and user-friendly) are inadequate.
- The agriculture in India primarily consists of **small and marginal land holdings.**
- Indian farmers are generally acquainted with their traditional systems of agricultural-practices, who are generally **reluctant to try something new like PA/tech-driven-agriculture.**
- The **banking and financial institutional systems have preferential bias** in financing agricultural sector, **owing to its uncertainty.**

The Way Forward

- There is an urgent need to **provide policy push**, which is being initiated by the Government of India recently (since 2017), at a strategic level.

- In addition to feeding domestic consumers, Indian agricultural-system should focus on exploring/ harnessing the export markets for agri-based/ processed products, which will give the higher returns to farmers and increased foreign exchange reserves.
- The **adoption of technology-oriented Agricultural Management Systems (AMS)** primarily requires more of a mind-set shift and cultural transformation in both bottom-up approach and top-down approach.

The precision agriculture is not only the need of the hour but also has the tremendous potential in increasing agricultural farm-incomes, facilitating empowerment of farming community and creating large scale impact in rural India.

FARMING 2.0: DIGITISING AGRI VALUE CHAIN

- Digital technologies are most important recent innovations in terms of all actors in the agri-food chain.
- **It not only assists in primary production but also extend support from food supply chain management to new business development.**
- Digital agriculture could help farmers to be more precise with inputs through precise weather forecasts or sensors scanning the soil.
- Additionally, **through the use of robotics or autonomous machines, farmers will be able to curb down labor costs which might lead to unemployment in the sector**.

Leveraging Social Media in Agri Value Chain

- There is a growing focus on the **farm-to-fork movement**. Since **social media** is an open dialogue, it enables users to express interest, or disinterest, in products, services or businesses in a public forum.
- The same level of engagement with social media can benefit those further up the supply chain as well, as increasing number of farmers and farm-based businesses.
- A farmers-network in India called **Harvesting Farmer Network (HFN)** with mobile application provides a virtual support group advice on crops and agricultural practices.
- The **HFN mobile application is useful to get farm information, advisory, mandi prices of India's important mandis and farm produce**. The application is also helpful buying and selling by farmers themselves.

Mobile and Internet Penetration in India

- **Internet and mobile usage in India is all set to cross the 900-million mark by 2023.**
- Digital India, launched in 2015 aims towards the **promotion of digital literacy** and **creation of digital infrastructure** for empowering rural communities.
- The use of Information and Communication Technology (ICT) to **support the transmission of localised information** and services working towards making farming socially, economically and environmentally sustainable, while contributing to the delivery of nutritious and economical food for all - this comprises Digital Agriculture.

Recent Initiatives in Digitalising Agriculture

- To promote ease of agricultural exports from India, three portals have been developed to reduce transaction time and cost in an effective and transparent manner for safe food export traceability, single laboratory for accreditation and approvals and for monitoring export alerts from importing regulators.

- **Mobile application Meghdoot** to help farmers by providing forecast relating to temperature, humidity, rainfall, wind speed and direction, and how to take care of the crops and livestock.
- The **iTEAMS, Meghalaya** is an e-extension programme for market-oriented, cloud-based facilitation and farm advisory service that connects farmers to markets through real time agro advisories, affordable logistics, and market information.
- **As per the eNAM portal of Ministry of Agriculture as on 16 November, 2020, 1000 regulated markets are linked with the e-National Agriculture Market.**
- **Agri Market APP** is a mobile application been developed with an aim to keep farmers abreast with the crop prices and discourage them to carryout distress sale.
- **AgroPad** is an **AI-powered technology** helping farmer's check soil and water health. AgroPad10, **developed by IBM**, is a paper device about the size of a business card. The microfluidics chip inside the card performs on the spot a chemical analysis of the sample, providing results in less than 10 seconds.
- The Government of India recently launched the **'Swamitva scheme' under which drones will draw a digital map of every property falling within the geographical limits of a village and demarcate the boundaries of every revenue area.**
- In **2018**, the **Karnataka government** launched "**Plantix**", **to smartly detect pests, plant diseases, and nutrient deficiencies.**

Challenges Faced by Farmers in Adopting Digitalisation in Agriculture

- There is **no policy and operational guidelines to use digital media and ICTs for the agriculture** digitalisation.
- The **lack of timely information on farm inputs, unorganised credit, and absence of market linkages.**
- In rural areas, the **reach of e-technology is really poor.**
- **Lack ofbasic computer and smartphone usage** skill and knowledge, high costs for services and less literacy.

Way Forward

- For digital farming to succeed in India, the innovations must focus on lowering the cost of technology so that it is available and affordable for the smaller farmers.
- More specifically, the **full potential of ICT**, **big data, Artificial intelligence, Internet of Things (loTs), Block chain and Machine leaning and precision agriculture** will need to be harnessed to the task of generating sustainable productivity growth.
- The **private sector** can play a crucial role in expanding e-commerce and other platforms into food supply chains.
- More and continuous **long-term investment is needed** in public sector.
- Agriculture related research-academic institutions NGOs, Farmer Producer Organisations should also reorient themselves towards digital agriculture for the better impact.

PUBLIC PRIVATE PARTNERSHIPS FOR DIGITALISATION IN RURAL INDIA

- It is expected that in the next ten years, there will be dramatic changes in the agrifood system spearheaded

by advanced digital technologies like Blockchain, Internet of Things (IoT), Artificial Intelligence (AI), Immerse Reality, etc.

- Major transformations of agricultural systems, rural economies, communities and natural resource management will be required for digitalisation of rural areas to achieve its full potential.
- The rural segment could broadly benefit from the raising farmers' incomes and boosting their income security, one of the highest priorities for the government, this can be aided by **three digital themes**: - **Digital financing and insurance payouts** enabled by **consolidating information** and facilitating **credit-scoring and yield forecasting models using satellite and weather data**.
- The **rural economy contributes about 46 percent to the national income**. So far, the rural economy had been an informal and cash-oriented with most of the rural working population engaged in the "**Earn and Pay**" segment.

Government Initiatives

- **Kishan Suvidha**is an omnibus **mobile app** developed to help farmers get relevant information instantly. The app provides **information on various details such as weather, market prices, seeds, fertilisers, pesticides, etc.**
- **Farmer Portal** is envisaged to make available relevant information and services to the farming community and private sector through the use of information and communication technologies, **to supplement the existing delivery channels provided for by the department.**
- **mKisan**SMS Portal has been conceptualised to give a quantum leap in coverage of farmers and geographical area in a **timely, specific, holistic** and **need based knowledge dissemination**.
- **NREGA** soft envisions implementing e-Governance across State, District and three tiers of Panchayati Raj Institutions. It provides **information to citizen in compliance with the right to information Act (RTI Act)**.
- **Pradhan MantriGramin Digital SakshartaAbhiyaan (PMGDISHA):** PMGDISHA is a scheme **to make six crore persons in rural areas, across States/UTs, digitally literate**, reaching to around 40 percent of rural households by covering one member from every eligible household by 31st March, 2019.
- **Pradhan Mantri Jan-DhanYojana (PMJDY)** envisages **universal access to banking facilitiesat least one basic banking account in every household, financial literacy, access to credit, insurance and pension facility.**
- **BHIM (Bharat Interface for Money) i**s an app that makes payment transactions simple, easy and quick using Unified Payments Interface (UPI).
- **Crop Insurance Mobile App** can be used to calculate the insurance premium for notified crops based on area, coverage amount and loan amount in case of loanee farmer.
- **e-Panchayat**is an e-Governance initiative for the rural sector providing comprehensive software solution attempting automation of Gram Panchayat functions.
- **E-NAM** Portal provides a single window service for all APMC related information and services.
- **PusaKrishi** app helps the farmers to find easy solutions to problems in their farm fields and get information about weather and accordingly take measures to save crops.
- **Soil Health Card** aims at promoting Integrated Nutrient Management (INM).
- **Deendayal Upadhyaya Gram Jyoti Yojana** is designed to provide continuous power supply to the entire rural India.
- **GARV Grameen Vidyutikaran Mobile App** provides real-time updated data of ongoing electrification process to all users/stakeholders and provides information about Government schemes and electrification data.

Benefits of Digitalisation

- **To Get Skilled:** With the activation of internet facility new skills sets from different e-learning courses to accessing large number of books etc., could be done.
- **Transform their way of working:** The manual work and process need to be transformed into an automated process which can be done by widespread digitization through the medium of a software.
- **Digitalisation of Education:** Digital access is not only cheap and effective but also make it available to a larger mass of audience regardless of the terrain.
- **Ensure Safety and Security:** Digital technology also helps in providing safety and security.
- **Digitalisation of Agriculture:** increasing use of Information and Communication Technology (ICT) to support the transmission of localized information and services.
- **Mobile apps:** Mobile apps and other agri-based information would speed up its outreach to the farming community and could be a final game-changer in the long run.
- **Transportation:** Transportation of agri produce can be made efficient.
- **Valuable Platform: "KisanRath" is** being seen as a valuable platform in ensuring uninterrupted supply linkages between farmers, warehouses, FPOs, APMC mandis and intra-State and inter-State buyers.

Public Private Partnerships -lending a Crucial Helping Hand

- The government and regulatory bodies have rolled out several policy and financial initiatives aimed at inclusive rural growth with notable ones including the **Aadhaar, a unique biometric identifier**, **Jan Dhan, the zero balance savings bank accounts that help direct transfer of social benefit payments**, **BHIM- the digital payment infrastructure BHIM**.
- It is at this juncture that the government, regulatory bodies, financial service providers and fintech companies need to collaborate and set the ball rolling. Some basic steps that need to be taken in this direction include:
  - To facilitate digitalization of rural incomes.
  - Make it possible to convert digital income into cash.
  - To focus on issues related to safeguarding digital payments and digital identities putting in place consumer protection rules is critical.
  - Targeted financial literacy and capability training can have a positive impact in such areas by increasing savings and promoting financial skills.
  - Fintechs can put new technologies to work in order to shrink distances, expand customer segments, offer customised experiences, and bring in efficiency.

A collaborative and mutually beneficial model that unifies the advantages of both physical and digital is therefore the answer to address the real challenges on the ground. The **PPP model will ensure that the agricultural sector can still remain as a primary engine of rural growth and poverty reduction in India by bringing together the collective power of all the stakeholders in the agricultural ecosystem-the government, private companies, and even research institutions.**

Key Areas where PPP model could be used:

- **Providing Cutting Edge Tools:** Knowledge about crop rotation, weather patterns, fertiliser, high-yield crops, pest management, waste water utilisation, nutrition use etc. would all be available.
- **Insulating from Vagaries of Nature:** The public -private partnerships that can pull out the sector from inclement weather, enable farmers cover themselves through insurance could be the critical lifesavers. The **Maharashtra government has rolled out its Maharashtra Public-Private Partnership for Integrated Agricultural Development (PPPIAD) project**. PPPIAD, a successful PPP enterprise that is **developing integrated value chains for selected crops through PPP and co-investment.**

- **Helping the Food Processing Industry:** The government's role besides funding through the partnership can also provide **tax rationalisation, duty exemptions, increase in public spending, priority sector lending and foreign direct investment (FDI).**
- **Agri-startups:** Agritech Startups are providing relevant and **innovative solutions** to a number of challenges faced all across the agricultural value chain.
- **Conclusion**
- The success of a new and efficient India hinges on the inclusion of rural areas into a digital framework and make the benefits of technology accessible to all sections of society.
- **Digitalisation can help rural India in e-governance services, banking and financials, education and healthcare, mobile/DTH recharge, e-ticketing, online shopping, etc.**
- **Digital Society is broader than 'digital economy.' A digital society integrates all social spheres and lends a competitive edge to the overall economy.**

PULSES SCENARIO IN INDIA

- Pulses are a crucial element in the food basket of predominantly vegetarian population in our country to ensure nutritional security.
- These are the relatively most inexpensive source of proteins and bestow immense positive externalities to the environment enriching soil fertility and being a water efficient crop.
- **Green revolution has significantly improved productivity and production of many crops.** However, this increase has been comparatively lower in case of pulses.

Production

- Production of pulses reached **record levels of 231.3 LMT and 254.2 LMT during 2016-17 and 2017-18, respectively.** However, fluctuation in production levels is still Witnessed.
- **National Food Security Mission (NFSM)** was **launched in 2007-08to increase the production of rice, wheat and pulses through area expansion and productivity enhancement**; **restoring soil fertility and productivity**; **creating employment opportunities**; and **enhancing farm level economy.**
- **Procurement of rice, wheat and sugarcane at MSP/Fair and Remunerative Prices (FRP) may be rationalized keeping in view stability in their prices, self-sufficiency in production, ample buffer stocks**. This is essential to enable shift towards less-water intensive crops and aligning cropping pattern towards nutrition rich diets which is in line with the Sustainable Development Goals (SDGs) and ensuring their availability at affordable prices.
- **Price Stabilization Fund (PSF) scheme** implemented by **Department of Consumer Affairs** is largely utilised towards **creation and maintenance of buffer stock of pulses.** These **include 5 major pulses viz., Tur, Urad, Moong, Chana and Masur.**

Significant price variations in pulses are observed on a year-on-compared to relatively milder alternating movement between harvesting and lean season within a year. This may be attributed to the fact that **lagged effect of both instances of bumper production as well as decline in production on prices are often observed**.

Key emphasis should be laid down in **stabilising domestic production levels in a sustainable manner with a balance between price and non-price interventions** ensuring adequate incentives to the farmer.

Scientific storage and its decentralisation is key infrastructure to ensure smooth availability round the year and stability in prices.

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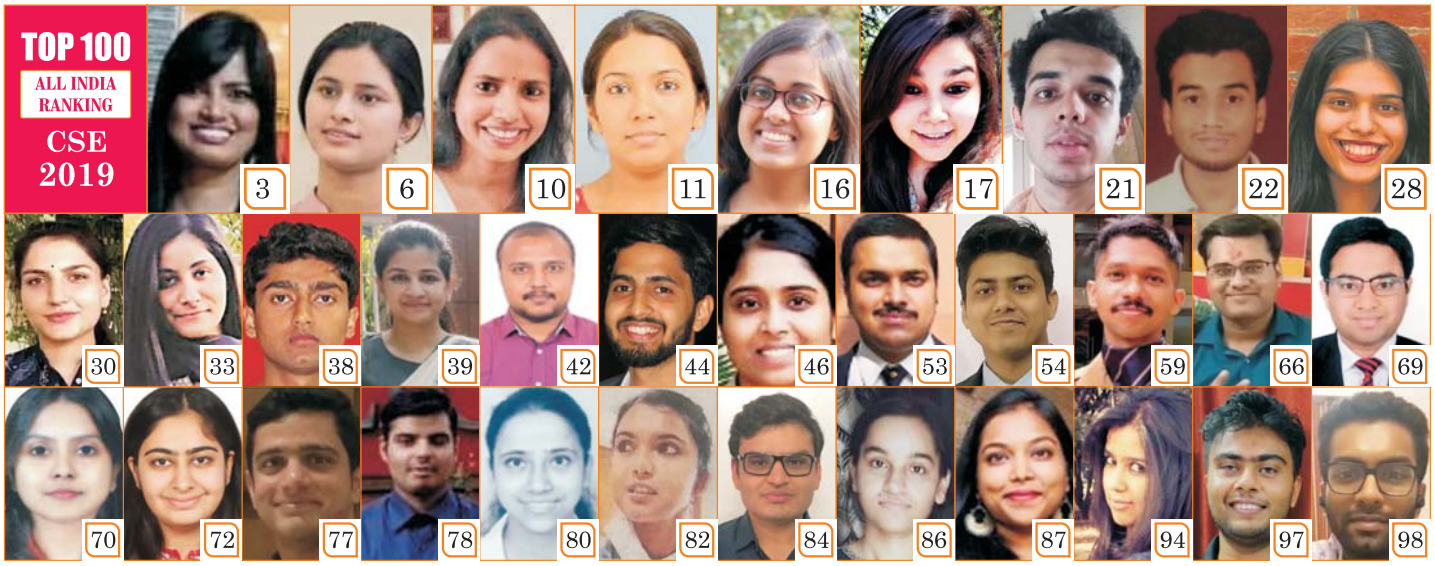

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