

# Rural India: Innovation for Inclusiveness

**Inclusiveness is fundamental to development principles. It is indisputable that the availability of facility or resource alone will not ease the life of the under privileged or the marginalised, unless they are provided with seamless access. Innovative ideas in development sectors have tremendously contributed in bringing down the gap in the equitable distribution of development potential between urban and rural populations. The article discusses the impact of innovation in nurturing inclusiveness in Indian rural sector.**

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**A**ccording to the United Nations, innovation for development means using the most up-to-date concepts, tools, and is about finding better ways to create impact on people and the planet, to strengthen resilience and build more inclusive societies. India has been consistently improving its position in Global Innovation Index (GII), published by World Intellectual Property Organization (WIPO), from 48 in 2020 to 40 in 2023. In GII 2023, our country is the first among 37 lower-middle-income economies in Central and Southern Asia. Between 2001 and 2020, the number of scientific and technological capabilities that India is specialised in jumped from 42% to 68%, and from 9% to 21% respectively. Innovation has always been the key pillar for progress. Government of India's policies for the past few decades reinforced the innovation drive with inclusive development as central theme.

For example, the number of telephone connections surged from 41 million to 943 million during 2001-2012, out of which 911 million alone were mobile phone. The increasing tele-density (number of phone connections per 100 people) and sharply declining tariffs in a competitive market made India the fastest-growing telecommunications market in the world and placed it far ahead of its peers in the Central and Southern Asian regions. Rural tele-density has grown over 30 times from 1.7% in 2004 to 58.5% in 2023. Further, the urban-to-rural tele-density ratio has reduced from 12.24 to 2.29 during this period. The Prime Minister Wi-Fi Access Network Interface (PM-WANI) scheme envisages provision of Broadband through public Wi-Fi Hotspot providers and also helps to increase internet penetration in rural areas. It is interesting to observe how these achievements reflect in the lives of rural population by nurturing inclusiveness.

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## Healthcare

One of the major concerns of rural population is their access to quality healthcare facilities. Most of the highly qualified healthcare professionals tend to choose to work in urban areas. Villagers often find secondary-level healthcare either inaccessible or unaffordable. The digital innovations have played a major role in addressing this issue effectively to a great extent. e-Sanjeevani – the national telemedicine service- was a landmark in India's e-health initiatives and a game changer in the rural health sector. The number of consultations crossed 100 million in about 3 years since its launch in November 2019 and now stands at 241 million consultations. It is important to note that over 57% of the beneficiaries of e-Sanjeevani are women and around 12% of beneficiaries are senior citizens. This has brought the expert health advice to the rural population who could not afford to travel to the cities for secondary health care needs. Digital Health Innovations Group at Centre for Development of Advanced Computing (C-DAC), Mohali (India) is the implementing agency for e-Sanjeevani. Since 2018, the group has been working with the Ministry of Health and Family Welfare (MoHFW), Government of India to conceptualise a population-scale telemedicine application. Accordingly, e-Sanjeevani was customised to be implemented at more than 1,55,000 Ayushman Arogya Mandir (AAM) across India in Hub-Spokes model. Patients who walk

into Health and Wellness Centres (HWCs), community health officers in Health & Wellness Centres facilitate the teleconsultation with the doctors and specialists in hubs established in secondary/tertiary level health facilities or medical colleges.

## Education

The urban–rural disparity in education has a long-lasting and fathoming impacts in worsening the social inequality. The children of urban dwellers have the advantage of choosing the best among better options both in case of schools and for extra-curricular trainings. This inequality is reflective in the results of most of the post-secondary competitive exams. Increased penetration of internet and the boom in education apps have helped the rural children to gain opportunities as good as their urban counterparts. Online classes during the pandemic period were a major catalyst to adopt digital learning in rural India. Now, the rural children have access to all world-class resources in a single click. Decline in the cost of data and the availability of lower-cost digital device have reinforced the trend of harnessing the power of digital education.

Further, integration of Artificial Intelligence (AI) has created an environment for customised learning. Mobile apps, internet-based courses, and interactive educational platforms empowered by AI algorithms are providing high-quality learning materials conveniently accessible to both students and educators. The

**Myth:**  
DIKSHA portal is not beneficial for students in remote areas or rural areas.

**Fact:**  
DIKSHA portal provides access to digital resources and learning materials for students across India. Including those in remote and rural areas, promoting inclusive education.

expansive capabilities of AI technology render it cost-efficient, alleviating the financial strain typically linked with conventional teaching approaches.

### Banking and Finance

Getting credit or accessing the banking services were not easy for the rural population in general, and for the underprivileged in particular. This hurdle has started alleviating with the advent of Aadhaar-based banking. One of the key ways Aadhaar has facilitated bank credit in rural India is by streamlining the Know Your Customer (KYC) process. Aadhaar's extensive database and biometric authentication capabilities have enabled banks and financial institutions to improve credit scoring and risk assessment processes, particularly for underserved populations in rural India. By leveraging Aadhaar-linked data, lenders can better evaluate the creditworthiness of borrowers, mitigate risks, and offer tailored financial products suited to the needs of rural customers. Under initiatives such as the Credit Linked Subsidy Scheme (CLSS), Aadhaar authentication has been instrumental in providing housing finance to rural beneficiaries.

Innovative digital payment solutions are reshaping how transactions are conducted in rural areas. With the rise of mobile wallets, QR code payments, and USSD-based services, rural residents can now make purchases, pay bills, and transfer money digitally without the need for physical cash. These solutions offer security, convenience, and efficiency, driving financial inclusion

and fostering economic growth in rural regions. Further, agent banking has emerged as a game-changer in rural areas where establishing brick-and-mortar bank branches is often economically unfeasible. Through agent banking, financial institutions leverage local businesses or individuals as agents to provide basic banking services in rural communities. This model extends banking services to remote areas, allowing villagers to deposit, withdraw cash, and perform other banking transactions conveniently within their own neighborhoods.

### Agriculture

About 70% of the rural households depend on agriculture for livelihood. Raising agriculture productivity and ensuring market linkage have always been stumbling blocks in improving the lives of farmers. Climate change, pest attacks, lack of easy access to insurance schemes, and deficit of market information often exacerbate the income disparity of rural farmers, and leads to poverty. Technological advancements and innovative approaches pave way for a paradigm shift to make agriculture profitable and a reliable source of income.

The advent of drones is one such example. Drones are being used in precision spraying of fertilisers and pesticides, field-level monitoring of crops, planting of crops, soil property assessment, crop health monitoring, etc. This has helped to improve farming efficiency by reducing time and labour, and by improving precision. AI-enabled drones can detect the moisture content, and thus helps to improve irrigation efficiency as well. The Government of India is providing financial assistance for procurement of drones. 50% of the cost of drone, up to a maximum of Rs. 5.00 lakhs, is provided for Small and Marginal, Scheduled Caste/Scheduled Tribe, Women, and North Eastern State farmers, whereas other farmers are given 40% of the cost up to a maximum of Rs. 4.00 lakhs. The Government has also conceptualised



a Central Sector Scheme for providing drones to the Women Self Help Groups (SHGs) with an outlay of Rs. 1261 Crores. The scheme aims to provide drones to 15000 selected Women SHGs for providing rental services to farmers for agriculture purpose (application of fertilisers and pesticides).

Digitisation of farm insurance helped in speedy resolution of claims. The mobile apps linked with crop insurance help the farmers not only to find out complete details about insurance cover available in their area but also to calculate the insurance premium for notified crops, coverage amount, and loan amount in case of a loaned farmer. Farmers can report crop loss through the apps or through Krishi Rakshak Portal helpline. Weather Information Network and Data System (WINDS) is launched to augment the weather data collection system in the country in terms of adequacy of network, data collection, data standardisation, data hosting, and dissemination through coordinated efforts with India Meteorological Department (IMD) and States, to support the crop insurance requirements. Kisan Call Centre and many apps are in place which are specially designed to provide information about fertilisers, subsidies, new varieties of plants, pesticides, current weather, forecasts for the coming days, and market prices of commodities in nearby Mandis. Krishakti, Kisan Suvidha, Soil Saathi, Krishi Mitra, mKrishi, Sanchar Shakti, Pusa Krishi, and Shetkari are a few examples.

### Access to Clean Water

According to the World Health Organization (WHO), access to safe drinking water is when at least 20 liters of water per person per day is available from an improved source within one kilometer of a person's home. As per the National Family Health Survey – 5 (2019-21) the population living in households with an improved drinking-water source in urban areas is 98.7% while that in rural areas is 94.6%. This disparity further impacts in rural health standards, social security, children's educational opportunities, and earning capability. Startups working on technological innovation have been trying to bridge this gap through various interventions. Boon (formerly known as Swajal), a water-tech startup is striving to make water accessible and affordable by ensuring reliable supply of safe drinking water. Their proprietary water ATMs are energy-efficient systems that use solar energy for water purification and vending, with easy-to-use user interfaces and

payment mechanisms. IoT-based remote monitoring capabilities built into the cloud platforms makes repairs and upgrades seamless. They have installed over 400 Water ATMs in railway stations, schools, hospitals, urban slums, rural areas, and bus stations. The startup has currently impacted over 20 lakh people across more than 140 Indian villages by democratising access to clean drinking water.

Excessive use of groundwater and lack of information about the depth of groundwater table are challenging in rural water management where a vast majority is dependent on groundwater. Bhujal app, the first of its kind Android app, made the process simpler by making it possible to measure the water level within a minute without even opening the borewell. This helps any user, particularly the rural farmers to get an idea about water availability and facilitate better planning. This avoids early drying of a borewell and thus proves to be a powerful decision-making tool in the demand side. It also helps to save electricity due to the regulated consumption of borewell water.

Kheyti is a startup working to address water scarcity issues for small farmers. Kheyti's Greenhouse-in-a-Box helps them reduce climate risk and increase yields. According to the founders, the plants in the greenhouse require 90 percent less water than those outdoors and yields are seven-times higher. Being ninety percent cheaper than a standard greenhouse, they are contributing to increase farm incomes, helping them invest more in their farms and other social needs like healthcare and education of children. It also contributes to sustainable agriculture practices by using less water and fewer pesticides. Water being a scarce commodity in large parts of rural India, 90% water savings on agriculture is a vital step in ensuring rural water security.

### Conclusion

Innovation in rural India has contributed significantly towards the sustainable development goals (SDGs) and is well aligned with the Prime Minister's vision of *Collective Efforts, and Inclusive Growth*. However, since most of the life-easing innovations are mounted on digital platforms, robust digital infrastructure is essential to sustain the growth and development in rural India. It is also vital to be cautious about the urban bias among large firms which could be detrimental to the idea of rural inclusiveness. □