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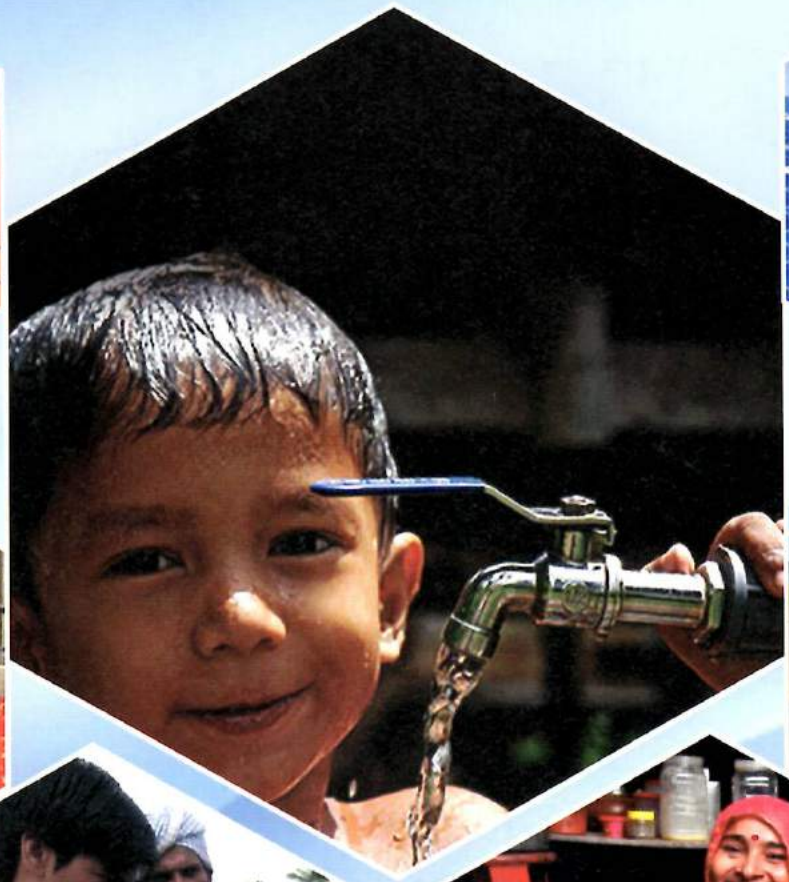
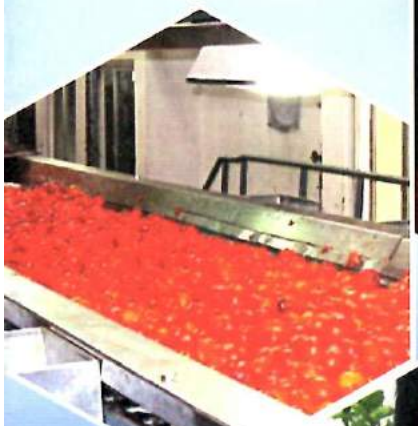
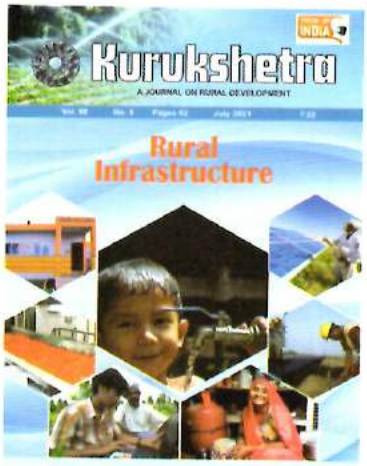
Rural Infrastructure







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Kurukshetra seeks to carry the message of Rural Development to all people. It serves as a forum for free, frank and serious discussion on the problems of Rural Development with special focus on Rural Uplift.

EDITORIAL

Infrastructure is the backbone for ensuring the development of any country. It is important to develop the infrastructure in urban as well as rural sector for the overall development of a nation. In India, the government of India is working round the clock for establishing better infrastructure in different areas so that nation can move forward on the track of economic and sustainable development.

In the July issue of Kurukshetra, we have focused on how infrastructure development is taking place in the country as well as its importance. Developing robust infrastructure is one of the inherent pillars of the AatmaNirbhar Bharat Abhiyaan as well. The government of India has put a lot of emphasis towards betterment of rural infrastructure. The development of rural infrastructure has been taking place as a multi-pronged strategy ranging from focused interventions in particular fields like construction of new avenues, and maintenance of roads.

As part of developing digital infrastructure, Centre's Digital India programme is playing a revolutionary role in connecting India by bridging the rural-urban India divide. Its vision is to transform India into a digitally empowered society and knowledge economy by providing broadband highways and mobile connectivity etc.

Constructing road network has been crucial part of India's development. Pradhan Mantri Gram Sadak Yojana has been a key scheme in this connection. The programme emerged and evolved as a key component towards rural infrastructure development. Through it, road connectivity has been widened and work is in process towards building a robust and vibrant road infrastructure.

The issue is also carrying a detailed article as to how rural irrigation infrastructure has been strengthened under the Pradhan Mantri Krishi Sinchayee Yojana. The effective implementation of PMKSY will bring in sustainability in agriculture in future.

With a large number of programmes and schemes of the government of India, all efforts are being made as development of infrastructure plays an important role in engine of growth to change the lives of people especially in the rural parts of the country.

We hope that the readers of our journal will be benefitted after reading this issue. Stay Home Stay Safe. Happy reading.

Rural Transformation through Bolstered Infrastructure

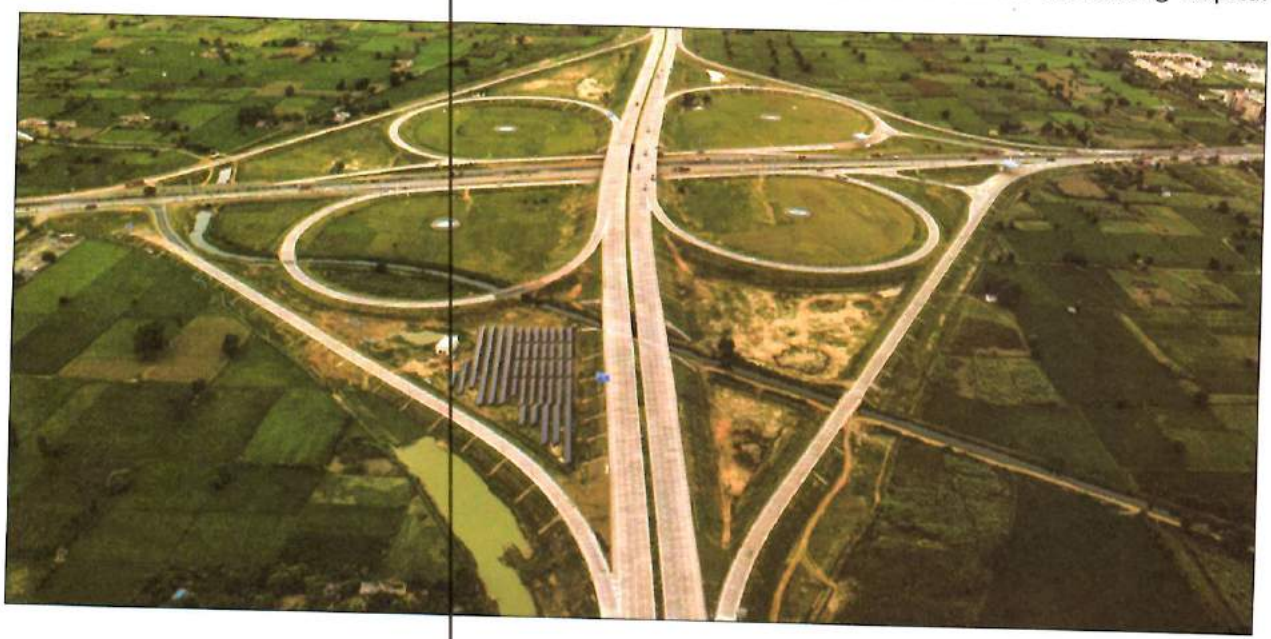
Dr. Ishita G. Tripathy

There is a pressing need for a reinforced rural infrastructure to accomplish the country's mission of a vibrant AatmaNirbhar Bharat. A robust rural infrastructure through its systemic linkage effects - both backward and forward, is capable of facilitating better avenues of farm and non-farm product marketing and thereby adequately remunerating the activities of farmers, manufacturers and service providers in a rural set up. It is well established in literature that a well-developed rural infrastructure contributes positively to inclusive growth as it not only facilitates integration of the rural economy with the rest of the economy, but it also ensures economic development through reduced cost of production and logistics, increased productivity, improved economies of scale, enhanced employment and improvement in public and private investments in rural farm and non-farm activities.

Infrastructure is one of the five inherent pillars of AatmaNirbhar Bharat, the other four being economy, technology-driven system, vibrant demography and demand. The word 'infrastructure' has wide connotations. It spills over a large number of sectors and subject domains. Consequently, desired programmes for the development of infrastructure are implemented by several subject Ministries and Departments of Government of India (GoI) and also State Governments. The development of rural infrastructure has been taken up as a multi-pronged strategy ranging from focused interventions in particular fields like construction and maintenance of roads (e.g. Pradhan Mantri Gram Sadak Yojana) to cluster development by provisioning for infrastructure facilities (Shyama Prasad Mukherjee Rurban Mission). Infrastructure being a public good, a crucial role is played by the Government in creating and maintaining infrastructure assets. In this context, this article endeavours to assess some recent initiatives implemented by the government to strengthen physical infrastructure which are essential for the rebound of the rural economy, especially in the backdrop of COVID-19 pandemic and the resultant lockdowns and the reported reverse migrations.

Some Recent Initiatives

Budget 2021-22 underscored the need to focus on infrastructure, in the backdrop of the pandemic, by making a large number of announcements for this sector. These ranged from Production Linked Incentive Schemes to Mega Textile Parks; from strengthening the National Infrastructure Pipeline to proposing the creation of Development Financial Institution; from asset monetisation to increasing capital



budget; etc. Triggered by the pandemic and the consequent closure of economic activities, various initiatives had to be taken in the infrastructure sector, specifically with reference to rural areas. These have a two-fold impact in terms of boosting demand of goods and services in rural areas and also to facilitate marketing of rural produce. Infrastructure projects typically have a long gestation period and invariably require high investments. An important loan agreement, in this context, was signed between Government of India and the New Development Bank in December, 2020, to create durable rural infrastructure assets through natural resource management works and to generate employment to stimulate rural demand.

Public policy emphasis on creation of sustainable rural infrastructure is not new. Strengthening of infrastructure in rural areas have remained an integral part in the country's five year plans and annual plan interventions with the sole objective of making rural India vibrant by addressing issues of poverty, income and livelihood insecurities in rural areas. Government of India had set up the Rural Infrastructure Development Fund (RIDF) within National Bank for Agriculture and Rural Development (NABARD) way back in 1995-96 with an initial corpus of Rs. 2,000 crore. The cumulative allocation of RIDF in 2020-21 was Rs. 3,78,348 crore. Various activities are eligible under RIDF, ranging from activities related to agriculture sector to social sector to rural connectivity. The Garib Kalyan Rojgar Abhiyaan was specifically launched in June, 2020 to deal with the issues arising out of the pandemic. The Abhiyaan was launched for a period of 125 days to provide immediate employment and to create livelihood opportunities for reverse migrants; and strengthen rural infrastructure. The Abhiyaan converged efforts of 25 on-going schemes of 12 Ministries/Departments of Government of India. More than 50 crore man-days of employment were created under the Abhiyaan.

The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) serves the two-fold objectives of providing livelihood security and creation of durable rural assets. The MGNREGS wage rate was revised upwards over the wage rate of 2019-20 as per the price movements in respective States/Union Territories (UTs) and notified by the Ministry of Rural Development for implementation from 1st April, 2020. From 1st April, 2020 to 6th February, 2021, more than 326 crore person-days were generated, which was about 44 percent more than the employment generated during the same period in 2019-20. Besides, the Pradhan Mantri Awaas Yojana-Gramin aims to provide pucca houses with basic amenities to all rural houseless households and households living in kutcha and dilapidated houses in rural areas. In 2020-21, 24.44 lakh houses have been completed under this programme.

Buttressing Transportation

India has a huge road network of almost 59 lakh kilometres[1], second largest in the world after USA. Out of this, as much as 71 percent is constituted by rural roads, which provide connectivity within rural areas (Table-1). Around 2 percent of the network is accounted for by National Highways, which are the arteries of the

transport system, running across States/UTs and rural/urban areas, connecting one part of the country with another. Despite the pandemic and the lock-downs, a milestone of constructing 37 kilometres of highways per day was achieved in 2020-21. Recent initiatives to ensure better roads have been literally path-breaking. One of these is National Highway Authority of India's decision to deploy Network Survey Vehicle. This is aimed at ensuring the quality of the National Highways. As per statistics released by Ministry of Road Transport and Highways (MoRTH), 36 percent of all road accidents in the country during 2019 took place on the National Highways. The break-up by rural or urban area, indicates that as much as 60.34 percent of all road accidents took place in rural areas. Evidently, there is need for corrective action. A move in that direction and to ensure timely assistance to the victims of such accidents during the Golden Hour, in April, 2021 MoRTH flagged off 90 Basic Care Ambulances with life-saving support system for various States/UTs.

Considering the situation created by the pandemic, various pro-active steps have been taken to facilitate availability of services for users. Some of these entail providing online services, e.g. for learner's licenses, etc. and providing grace period for renewal of driving licenses, facilitating inter-State border movement of trucks/lorries carrying essential goods, etc. The operationalisation of app-based two-wheeler taxis in rural areas suggested by MoRTH may assist farming and other rural communities with smoother movement. The release of draft safety requirements of Road-Trains is a step towards environment-friendly decongestion, while striving towards efficient movement of goods.

Through its widespread network, Railways are the preferred mode of transport for long distance travel. Throughout the pandemic, including the lockdowns, the railways continued to ensure that essential commodities, including foodgrains, fruits and vegetables, reach their destinations. With the objective of protecting people against the spread of the pandemic, the railways announced comprehensive measures, including the ones which discourage non-essential travel, and restored passenger services in a graded manner. A total of 4,621 Shramik Special trains operated between 1st May and 31st August, 2020 carrying 63.19 lakh reverse migrants[2]. Besides, the extension of Krishi Rail for transporting perishable fruits and vegetables by connecting production and consumption centres and an incentive for the farmers to use Kisan Rail, indicates GoI's commitment to ensure remunerative prices to the farmers and producers of rural areas. 50 percent subsidy on transportation of notified fruits and vegetables is being granted directly to Kisan Rail from October, 2020. These are important initiatives aiming at ensuring a seamless supply chain and reducing wastage of perishable products.

Inland water transport has the least freight cost of Rs.1.06/Tonne-Kilometre, as compared to Railways (Rs.1.36/Tonne-Kilometre) and Highways (Rs.2.50/Tonne-Kilometre). Freight transport through inland waterways can, therefore, create an enabling logistic environment for smooth, timely and cost effective transportation of farm

Table-1: Road Network & Road Accidents

Category of Road	Length of Road in km (as on 31st March, 2018)	No. of Road Accidents (2019)
National Highways	1,26,350 (2.03)	1,37,1919 (30.55)
State Highways	1,86,908 (3.01)	1,08,976 (24.27)
Other Roads, including Rural Roads	59,00,858 (94.96)	2,02,835 (45.17)
Total	**62,15,797 (100.00)**	**4,49,002 (100.00)**

Note: Figures in parentheses are percentage of total.
Source: 'Road Accidents in India: 2019', Ministry of Road Transport & Highways, GoI.

and non-farm products from the rural areas to various domestic markets. This can herald low cost inland water transport operations. For instance, since February, 2021, Liquified Natural Gas can be transported through inland waterways. Recent protocols signed with neighbouring countries, like Bangladesh, on inland water have proposed inclusion of new routes, etc. which would help in developing the hinterlands.

Promoting Marketing and Securing Storage

A very critical, but often neglected aspect, of rural infrastructure is marketing of agricultural produce. In this context, National Agriculture Market, also referred to as e-NAM, has created a virtual platform which integrates wholesale mandis across the country. The objective is to ensure remunerative prices for farmers by facilitating online trading of agriculture and horticulture commodities. As many as 1.69 crore farmers are registered on the platform, along with 1,820 Farmers Producers Organisations[3]. The platform is a potent tool to ensure transparent price discovery, while avoiding crowding at mandis and maintaining social distancing, which are essential during the current pandemic time. Earlier, in 2018-19, an Agri-Market Infrastructure Fund with a corpus of Rs. 2,000 crore had been announced. The Fund would be instrumental in upgrading agriculture marketing infrastructure. Besides, the development and upgradation of physical infrastructure of rural haats under the control of Panchayats through MGNREGS ensures the development of Gramin Agricultural Markets.

Construction or renovation of godowns and warehouses in rural areas are vital for enhancing storage capacity for agriculture produce. Despite the adverse impact of the pandemic, the funds released to implementing agencies under the Agricultural Marketing Infrastructure (AMI) and the number of godowns/warehouses assisted under AMI during 2020-21 are comparable with those of the previous years (Table-2). The Mission for Integrated Development of Horticulture and Pradhan Mantri Kisan Sampada Yojana are particularly important for ensuring cold storage facilities.

Ensuring Water Supply and Electricity

A resource that has multiple uses and is required for almost every type of production and consumption is water. Water supply, undoubtedly, is a vital component of infrastructure. The Jal Jeevan Mission has the objective of enabling rural households to have assured potable water through household tap connections. As on 15th March, 2021, 79 percent of rural habitations had 40 litre per capita per day (lpcd) of potable drinking water. In the backdrop of depleting water resources and receding water tables, the skill of water management assumes mammoth proportions, with the underlying challenge being in providing minimum amenities to the remaining households, i.e. 18 percent of rural habitations which have less than 40 lpcd of potable water and 3 percent of rural habitations which have water resources with quality issues (Table-3).

In October, 2017, Pradhan Mantri Sahaj Bijli Har Ghar Yojana – Saubhagya was launched for electrification of poor households, including rural households. Around 281 crore households have been electrified. The challenge lies in ensuring quality, uninterrupted power supply to those households.

Table-2: Funds Allocated & Released and No. of Godowns/ Warehouses Assisted under Agricultural Marketing Infrastructure

Financial Year	Funds Allocation (Rs. in crore)	Funds released to Implementing Agencies (Rs. in crore)	No of Godowns/ Warehouses Assisted
2017-18	486.89	378.32	1,325
2018-19	104.45	55.13	122
2019-20	79.04	56.13	432
2020-21 (upto 31st August, 2020)	213.83	37.60	219

Source: Lok Sabha Unstarred Question No. 432 answered on 15th September, 2020.

Table-3: Habitations and Population with Potable Water

No. of Rural Habitations provided with 40 lpcd or more of potable water		No. of Rural Habitations provided with less than 40 lpcd of potable water		No. of Rural Habitations having water sources with Quality issues	
Habitations	Population (lakhs)	Habitations	Population (lakhs)	Habitations	Population (lakhs)
13,49,723 (79 percent)	7,437.73 (78 percent)	3,04,343 (18 percent)	1,831.92 (19 percent)	48,219 (3 percent)	236.24 (3 percent)

Source: Lok Sabha Unstarred Question No. 3783 replied on 18th March, 2021.

All-Encompassing Telecommunications

The role of telecom in bridging physical distances has become further accentuated in the backdrop of social distancing having become the norm (Box-1). With the second largest telecom network in the world, India's rural tele-density in January, 2021 stood at 59.16 percent. The Bharat Net project is being implemented to provide broadband connectivity to 2.5 lakh Gram Panchayats. Taking the Digital India initiative of providing easier and better connectivity one more step forward, in August, 2020, it was announced that over the next 1,000 days, all 6 lakh villages in the country would be connected with optical fibre cable, including the islands of Lakshadweep which would be connected with submarine optical fiber cable. As on 8th March, 2021, Wi-Fi hotspots had been installed in 1,03,400 Gram Panchayats (GPs). Besides, an initiative has been taken to provide mobile connectivity to 354 uncovered villages in the strategic, remote and border areas. Various apps, including Arogya Setu and Kisan Rath, were launched early on during the first lockdown period to mitigate the adverse impact on the economy. Communications are an integral part of infrastructure. Their role in providing essential supplies to the remotest of areas was further heightened by Indian Posts tying up with Indian

Box-1: Telecom Services and Rural Accessibility

Beneficial applications of telecom services range across sectors. It is no longer surprising to see a farmer relying on the updates on his mobile to decide which market will fetch him the most remunerative prices.

To deal with the pandemic, physical school classrooms at various places have been transformed into online ones and tele-medicine is an integral part of the 'new normal'. However, access to the internet is still low in the country. UNICEF's 'United Nations Children Emergency Fund' report[1] released in March, 2021 estimates that only 8.5 percent of students in India have access to the internet, which accentuates the predicament created by the pandemic and the consequent closure of schools. To overcome issues faced by students who do not have digital means, learning programmes were also conducted during the academic year 2020-21 in the form of radio, community radio and CBSE podcasts, toll free numbers, missed calls, SMS-based requests for audio content, localised radio content for edutainment, etc.

There are still 25,067 inhabited villages with no mobile connectivity[2]. Broadband penetration, defined in terms of number of Broadband subscribers per 100 population, in rural areas vis-à-vis that in urban areas is 29.2 and 93.0, respectively[3].

The two-fold challenge lies in meeting the huge requirements of capital for adoption of new technology and for continuous investments in the maintenance of the telecom services; and to ensure that technology does not become a wedge between rural and urban areas. COVID-19 situation has posed enormous adversities to the humanity, but India's telecom sector has the capability to address and resolve many such issues to ensure unhindered progress of its economic activities – both in rural and urban areas.

1. UNICEF (2020), 'COVID-19 and School Closures: One year of education disruption'.
2. Lok Sabha (2021), 'BSNL Network in Rural Areas', Unstarred Question No. 4626 answered on 24th March, 2021.
3. Rajya Sabha (2020), 'Broadband Penetration in Urban and Rural Areas', Unstarred Question No. 493 answered on 17th September, 2020.

Council of Medical Research and including in their supplies the delivery of COVID-19 testing kits to laboratories across the country.

Concluding Remarks

A reinforced rural infrastructure can accomplish India's mission of an AatmaNirbhar Bharat. Better rural infrastructure, be it surface, air or water transports, telecom, rural marketing, warehouses or water supply and power, is capable of facilitating better avenues for rural growth and of appropriately remunerating the activities of the farmers, manufacturers and service providers in a rural set up. Accessibility to goods and services is often hindered by physical distance. Innovation and technology have successfully surmounted physical distance, as evident since the beginning of the on-going pandemic. A bolstered rural infrastructure contributes to rural transformation through its multiplier effect. Thus, there is a dire need to ensure building and strengthening rural infrastructure to ensure income and livelihoods to millions of rural inhabitants including the reverse migrants. The main challenges lie, however, in attracting investment, maintaining quality and ensuring convergence of programmes and schemes of multiple stakeholder ministries/departments of Government of India. A slew of measures have been taken by the Government of India to bolster the infrastructure. These measures have the objective of ensuring that essential supplies continue to reach their designated destinations in a time bound manner. The effectiveness of such measures in successfully overcoming the difficulties posed by the pandemic hinges on the level of competencies and compliances of the stakeholders of the country which comprise the State and Central Governments and the community.

Footnotes

1. Ministry of Road Transport & Highways (2019), 'Basic Road Statistics, 2016-17', https://morth.nic.in/sites/default/files/Basicpercent20_Road_Statics_of_India.pdf (accessed on 3.5.2021).
2 Ministry of Railways (2020), 'Shramik Trains', https://pib.gov.in/PressReleasePage.aspx?PRID=1656260(accessed on 2.5.2021).
3 LokSabha (2021), 'Connecting Markets on E-NAM', Unstarred Question No. 2438 answered on 9th March, 2021.

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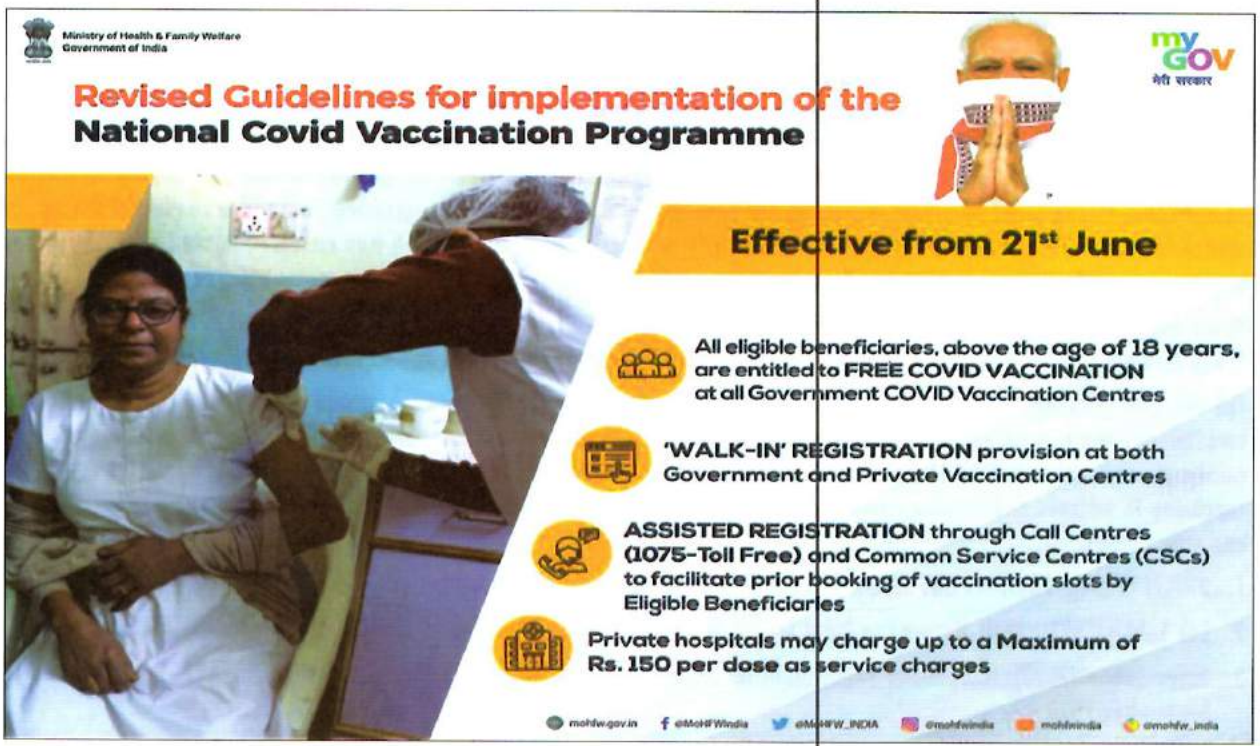

Rural Irrigation Infrastructure under PMKSY

Dr. K K Tripathy

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) aims at enhancing agricultural water productivity by providing and expanding not only irrigation, but also ensuring water use efficiency in both irrigated and rainfed agricultural activities. While the initiatives of the Government through its flagship irrigation scheme – PMKSY, public works programmes, and public water conservation works, are praiseworthy, it is desirable that the irrigation potential so created over the years should be utilised fully and the gap between the potential created and the actual utilisation be narrowed.

The father of our nation, Mahatma Gandhi, had rightly underscored the importance of adopting a bottom up approach for the country's socio-economic development and his statement "the real India lives in her villages" is often quoted in different development fora. Today, around 69 percent of India's population (88 crore) are rural and reside in more than 6.45 lakh villages. A vast magnitude of the rural populace, their prevalent socio-economic conditions and the need for ensuring better quality of life demand an all-round development in rural infrastructure. This is highly recommended by the policy makers to achieve the mission of inclusive growth with social justice. A series of welfare programme oriented development approaches were followed by the Government of India (GoI) and States through the implementation of 12 Five Year Plans and several annual budget-driven development plans. India, during seven decades of planning and democracy, has witnessed a series of strategic approaches to economic growth. The country's economists, planners and policy makers have always visualised a vibrant rural India and advocated improvement and expansion of rural infrastructure, be it agri-infrastructure, drinking water and irrigation, road and internet connectivity, housing, sanitation, electricity, marketing, logistic movements and the like.

Rural Infrastructure: Past Initiatives

Keeping in view the importance of rural infrastructure in the inclusive development process facilitation, Government of India had, earlier, launched a specific rural infrastructure programme called 'Bharat Nirman' as a time-bound business plan for implementation in four years (2005-2009). The six prioritised components included under the programme were irrigation, drinking water, electrification, roads, housing, and rural telephony. This initiative, which had relied on public-private partnership for immediate execution of infrastructure projects on a mission mode, fell short of achieving some of its pre-targeted objectives set under the programme. This led the government machinery to extend the timeline for completion of targeted activities beyond the

12th Plan Period (2012-17). A lot of infrastructure facilities are yet to be provided in rural areas for the sustenance of rural economic growth. Hence, the present government continued laying focus on the creation of rural infrastructure through subject specific schematic and programmatic interventions.

Agriculture and rural sectors' contribution to employment, income and wealth largely depends on how sustainable agri-infrastructure facilities are and how the nation organises itself for adopting improved agriculture practices, climate resilient varieties and technologies through enhanced research and development interventions. In this context, this article reviews the irrigation infrastructure status with special reference to the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) – an integrated rural irrigation infrastructure initiative which have immense potential to contribute to the agriculture productivity through enhanced water use efficiency.

Irrigation Infrastructure

As per a recent government estimate, the average annual water potential in the country is 1,869 Billion Cubic Meters (BCM) whereas the utilisable water availability is only 1,137 BCM per annum that comprises 690 BCM of surface water and 447 BCM of replenishable ground water. The per capita water availability in India is reducing progressively due to the increase in its population and injudicious use of water. The average annual per capita water availability in the years 2001 and 2011 was assessed as 1,816 Cubic Meters (CM) and 1,545 CM, respectively, which may reduce further to 1,340 and 1,140 CM in the years 2025 and 2050, respectively. This calls for an integrated water conservation and user-interface irrigation scheme for ensuring maximum water use efficiency. Further, PMKSY through its components can provide end-to-end solutions in irrigation supply chain, viz. water sources, distribution network and farm level application, provided this scheme is implemented effectively at the ground.

The Government's budgetary and policy interventions for PMKSY- Har Khet Ko Pani are directed towards identification, review, revival and expeditious execution of the ground water irrigation interventions by taking up potential cases in deprived irrigation districts. The policy outlook of the Government has considered the importance of expeditious actions and advocated efficient use of water in irrigation using micro-irrigation techniques, only after effective consultation with all the stakeholders. The Government's long-term goal has been for achieving integrated water use efficiency in India.

Consolidation of irrigation interventions through drawing up time-bound plan for execution of irrigation schemes and programmes, creation of incremental irrigation potential and expansion of installed capacity have remained important policy objectives of India's development planning. By 2016-17, a large number of irrigation related projects were facing financial constraints and the investments made therein were treated as 'sunken investment'. During 2016-17, 99 on-going Major/Medium Irrigation projects were prioritised for early completion. During 2016-17, it was decided to prioritise 99 ongoing major/medium irrigation (MMI) projects under Accelerated Irrigation Benefit Programme (AIBP) component of PMKSY with an objective to create an incremental irrigation potential of 111.09 lakh hectares against a total AIBP target of 151.33 lakh hectares. Out of the projects covered under

AIBP, 44 have either been completed or nearing completion. At all India level, 73.4 percent of total AIBP targeted irrigation potential was created up to March 2020. As many as 12 States were above the national average whereas two States viz. Gujarat and Himachal Pradesh achieved 103.7 percent and 100 percent of their respective targets. Details on State-wise irrigation potential created under PMKSY-AIBP from all major and medium irrigation projects in 25 States are presented in Table-1.

Per Drop More Crop (PDMP) initiative, implemented by Department of Agriculture, Cooperation and Farmers Welfare, has laid enormous focus on enhancing water use efficiency at farm level through Micro Irrigation (MI)

Table 1. Irrigation Potential created under AIBP of PMKSY - All Major and Medium Irrigation Projects (in '000 Hectares)

S. N.	State	Target for AIBP	Potential Created under AIBP					Potential Created under AIBP up to March 2020	percent Potential created over Target under AIBP
			2000-01	2005-06	2010-11	2015-16	2019-20		
1	2	3	4	5	6	7	8	9	10
1	Andhra Pradesh	788.9	0.4	26.8	60.1	29.1	0.0	330.8	41.9
2	Assam	162.3	7.5	2.7	6.2	0.0	0.0	123.9	76.3
3	Bihar	684.7	13.5	174.6	0.0	0.0	1.9	480.2	70.1
4	Chhattisgarh	213.7	2.7	11.6	2.8	1.1	0.0	208.7	97.7
5	Goa	23.8	0.1	0.3	0.8	0.0	0.0	20.7	86.9
6	Gujarat	1,830.2	40.6	34.1	28.9	185.9	28.7	1,897.1	103.7
7	Haryana	201.0	11.2	6.9	0.0	0.0	0.0	115.2	57.3
8	Himachal Pradesh	37.5	0.3	0.5	5.0	0.0	0.0	37.5	100.0
9	Jammu & Kashmir	105.7	0.9	1.3	8.9	1.0	5.3	64.1	60.6
10	Jharkhand	293.8	1.8	0.0	1.7	0.0	0.0	121.6	41.4
11	Karnataka	953.5	4.8	50.5	24.7	88.4	1.9	845.2	88.6
12	Kerala	57.5	1.6	0.6	2.6	0.5	1.0	52.1	90.7
13	Madhya Pradesh	1,028.5	9.5	21.1	89.7	52.0	11.2	975.2	94.8
14	Maharashtra	1,215.2	21.5	34.5	34.8	24.3	66.2	906.2	74.6
15	Manipur	52.0	0.0	0.0	4.0	2.0	0.0	40.4	77.7
16	Meghalaya	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	Odisha	649.9	13.0	4.2	36.2	7.3	15.2	320.8	49.4
18	Punjab	337.6	14.2	18.0	25.0	2.9	0.0	212.8	63.0
19	Rajasthan	1,605.2	12.7	81.2	396.0	6.3	0.1	1,161.1	72.3
20	Tamil Nadu	-	-	-	-	-	-	-	-
21	Telangana	827.9	8.4	34.7	8.1	69.2	3.7	633.3	76.5
22	Tripura	24.5	0.8	2.1	0.5	0.0	0.0	16.8	68.5
23	Uttar Pradesh	3,213.9	351.2	111.3	175.3	63.8	182.0	2,398.2	74.6
24	Uttarakhand	270.0	0.0	0.0	0.0	-	0.0	0.0	0.0
25	West Bengal	551.0	16.2	5.2	15.3	0.0	0.0	147.5	26.8
	Total	**15,133.0**	**533.1**	**622.1**	**926.7**	**533.7**	**317.2**	**11,109.4**	**73.4**

Source: Directorate of Economic Statistics, D/o Agriculture, Cooperation and Farmers Welfare, Govt. of India

technological interventions viz. Drip, Sprinkler Irrigation, Pivots and Rain-guns, etc. Similarly, the Watershed Development component of PMKSY targets to develop rain-fed portions of the cultivated area and culturable wastelands through ridge-area treatment, drainage like repair and renovation, soil and moisture conservation, rain water harvesting, nursery raising, plantation and afforestation, etc. with an objective to ensure drought proofing and prevention of soil erosion, vegetation, rain water harvest and recharge the ground aquifer.

As on 31.03.2020, about 125 lakh hectares of area are covered under MI out of which 59.62 lakh hectares are under drip irrigation and 6.57 lakh hectares are under sprinkler irrigation.

Table 2: State-wise Area Covered under Micro Irrigation (as on 31.03.2020)

(Hectare)

S.No.	Name of State	Drip	Sprinkler	Total
(1)	(2)	(3)	(4)	(5)
1	Andhra Pradesh	138,8126	519,165	1,907,291
2	Arunachal Pradesh	613	0	613
3	Assam	2,374	11,320	13,694
4	Bihar	12,488	106,979	119,467
5	Chhattisgarh	27,504	316,456	343,960
6	Goa	1,336	1,264	2,600
7	Gujarat	800,720	728,843	1,529,563
8	Haryana	35,812	592,221	628,033
9	Himachal Pradesh	6,900	5,386	12,286
10	Jammu and Kashmir	93	57	150
11	Jharkhand	25,081	17,298	42,379
12	Karnataka	723,178	1,048,906	1,772,084
13	Kerala	23,954	8,922	32,876
14	Madhya Pradesh	322,181	249,036	571,217
15	Maharashtra	1,314,779	561,647	1,876,426
16	Manipur	358	2,584	2,942
17	Meghalaya	308	307	615
18	Mizoram	5,088	1,688	6,776
19	Nagaland	2,424	5,855	8,279
20	Odisha	26,134	105,095	131,229
21	Punjab	36,025	13,704	49,729
22	Rajasthan	264,298	1,685,006	1,949,304
23	Sikkim	6,350	5,260	11,610
24	Tamil Nadu	686,572	252,573	939,145
25	Telangana	195,831	71,009	266,840
26	Tripura	444	1,651	2,095
27	Uttar Pradesh	32,442	178,624	211,066
28	Uttrakhand	10,965	7,944	18,909
29	West Bengal	10,329	78,182	88,511
	Total	**5,962,707**	**6,576,982**	**12,539,689**

Source: Directorate of Economic Statistics, D/o Agriculture, Cooperation and Farmers Welfare, Govt. of India

Table-2 gives State-wise details on areas covered under MI as on 31.03.2020.

The time has come to understand the value of water and its efficient use for irrigation. Minor Irrigation interventions have tremendous influence on not only water saving and conservation drives, but also, they support in enhancing crop-specific water use efficiency. PMKSY-PDMP ensures water use efficiency at farm level through precision or MI and better on-farm water management practices. Further, State Governments' initiatives aiming at reducing water demand for agriculture complement the drive of the Union Government in sustaining irrigation infrastructure. For example, while there is ban on early sowing of paddy by Haryana and Punjab, low water intensive crops are incentivised through Haryana's Jal Hi Jeevan Hai Scheme. Similarly, Maharashtra's policy directions on mandatory use of drip irrigation for sugarcane cultivation, etc. helps water saving and conservation of water resources from water stressed areas of the State.

A recent study on effectiveness of MI conducted by M/s Global Agri System Ltd. through Department of Agriculture, Cooperation and Farmers Welfare in 2014 highlighted the following:

- Average increase of 8.41 percent in irrigated area from the same source of water
- Irrigation cost is reduced by 20 percent to 50 percent with average of 32.3 percent.
- Electricity consumption is reduced by about 31 percent.
- Saving of fertilizers is in the range of 7 percent to 42 percent.
- Average productivity of fruits and vegetables increased by about 42.3 percent and 52.8 percent.
- Overall income growth of farmers is in the range of 20 percent to 68 percent with an average of 48.5 percent.

PMKSY: 2021-22 Budget Target

The water use efficiency in India for irrigated agriculture has remained relatively low. This results in higher quantum of water use per a unit of crop production in India vis-à-vis other developed nations. Keeping this in view, the Government of India, in its output outcome matrix of the union budget 2021-22 attempted to expedite its efforts in enhancing irrigation potential and efficiency in their utilisation at the grass-root level. The following are the major priorities defined with outcomes in the Budget 2021-22:

- Bringing additional 20 lakh hectares of land under minor irrigation, adoption of 6 lakh farmers for precession irrigation with crop diversification.
- At least an additional 1 lakh hectare area covered under Minor Irrigation in water intensive crops to enhance water use efficiency.
- 25,000 additional number of micro water harvesting structures created aiming at drought proofing of agriculture covering at least 50,000 hectares.
- Creation of 3.5 lakh hectare area additional irrigation potential by completing 54 projects under AIBP with a view to increase yield and income, replenish ground water and enhance water availability.
- 2 lakh hectare additional culturable command area covered to reduce gap between potential and utilised.
- Creation of 400 additional water user associations and handing over additional 300 assets to water user associations with a view to strengthen participatory management.
- 100 additional number of repair, renovation and restoration of water bodies and surface minor irrigation projects completed to create 0.5 lakh hectare additional irrigation potential.

PMKSY: Output, Outcome and Constraint

PMKSY aims at enhancing agricultural water productivity by providing and expanding not only irrigation, but also ensuring water use efficiency in both irrigated and rainfed agricultural activities. More and more emphasis on minor irrigation along with irrigation efficiency would ensure better yield in less water and less area by meeting soil water deficit and drought issues and also would support in balancing the soil-water ecosystem in the country. Effective implementation of PMKSY

would bring in sustainability in agriculture in future. Output, outcome and constraint analysis of PMKSY components are explained at Table 3.

Concluding Remarks

Water – the lifeline of agriculture is a basic necessity for all living beings and is essential for food production, food security, alleviation of poverty and ensuring sustainable development. Frequent dry-spells, reduced availability of ground water for irrigation and the resultant droughts and drought-like situations impacts Indian agricultural production and productivity. This calls for registering higher degrees of water use efficiency by installing modern and innovative irrigation infrastructure network in the country.

Table 3: Output, Outcome and Constraint Analysis of Major PMKSY components for Sustainable Agriculture

Component	Output	Outcome	Problems/Constraints
1	2	3	4
Per Drop More Crop (D/o Agriculture, Cooperation and Farmers Welfare)	▪ Making available efficient water conveyance and precision water application devices - sprinklers, drips, pivots, rain-guns, etc. ▪ Provisioning of protective irrigation facilities in rain-fed agriculture	▪ Increased crop productivity, enhanced farmer income ▪ Improved water use efficiency	▪ Durability of the assets created and or provided under the sub-scheme ▪ Maintenance challenges and cost pressures ▪ Lack of adequate scientific knowledge, training & awareness amongst the farmers ▪ Lack of knowledge about crop diversification
Watershed Development (Department of Land Resources)	▪ Focusing on development of rainfed portions of the net cultivated area and culturable wastelands through ridge area treatment, drainage line treatment, soil and moisture conservation, rain water harvesting, nursery raising, afforestation, horticulture, pasture development, livelihood for asset less persons, etc.	▪ Drought-proofing ▪ Prevention of soil erosion, regeneration of natural vegetation, rain water harvesting and recharging of the ground water table. ▪ Multi-cropping to provide sustainable livelihoods	▪ Rainfall uncertainty, poor economic conditions of the farmers and gradual land degradation in the rainfed areas ▪ Reduced flow of water to downstream reservoirs for improper development of watershed in the upstream. ▪ Lack of convergence planning and coordination amongst department of Rural Development, Panchayati Raj, Agriculture, forest, etc.
Har Khet Ko Pani (Ministry of Jal Shakti)	▪ Source augmentation, distribution, ground water development, lift irrigation, diversion of water from water plenty to water scarce areas, repair, restoration, renovation of traditional water bodies.	▪ Enhance crop yields ▪ Increase farmers' income ▪ Replenish ground water ▪ Improve water availability ▪ Accelerated implementation of advanced stage irrigation projects held up due to financial constraints up to 2019	▪ Gaps in the planning and implementation ▪ Awareness level of farmers on the benefits of the irrigation programme. ▪ Time and cost over-run due to delays in completion of irrigation works taken up. ▪ Unavailability of forest/environment clearances ▪ Lack of consensus amongst locals leading to resistance and conflicts
Accelerated Irrigation Benefit Programme (Ministry of Jal Shakti)	▪ focusing on faster completion of ongoing Major and Medium Irrigation projects including National Projects		

Source: Compiled by the Author

The comprehensive and continuous initiatives and efforts by the Union Government, State Governments and agricultural universities have, undoubtedly, led to notable accomplishments in natural resource management, input use efficiency, and drawing up climate resilient framework in agriculture through technological interventions. While the initiatives of the Government through its flagship irrigation scheme – PMKSY, public works programmes and public water conservation works of Ministry of Jal Shakti, Ministry of Agriculture and Farmers Welfare and Ministry of Rural Development are praiseworthy, it is desirable that the irrigation potential so created over the years should be utilised fully and the gap between the potential created and the actual utilisation be narrowed.

The prime reason for low degree of water use efficiency includes cultivation of crops without taking into consideration the agro-climatic conditions, innovation in irrigation activities and the accessibility and availability of water in the area. While procurement policy of the Government, market accessibility, etc., influence shifts in cropping pattern, free or subsidised power, traditional agronomic practices and reliance on flood irrigation, etc., boost disproportionate use of water in agriculture. This calls for promotion of integrated water management practices for popularising climate-smart agriculture through use of new and innovative irrigation and fertigation techniques. Considering the implementation issues and challenges of execution of these plans and programmes at the grass-root level, it is expected that the programme implementing agencies in the States would bring in good governance and follow best practices backed by smart-technologies to maximise the benefits of such development intervention. There is also a need for adequate and timely involvement of farmers, farmers' groups, Self-Help Groups, Water User Associations, Farmer Producer Organisations in the planning and execution phases of irrigation initiatives will ensure actualisation of maximum intended benefits of the PMKSY.

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Potential in Food Processing Industry

Dr. Neelam Patel and Ranveer Nagaich

The importance of the food processing industry cannot be overstated as it is the link industry between agriculture and manufacturing. The Food Processing sector holds the potential to infact empower women by creating avenues for entrepreneurship and employment. The impact of the food processing sector on the economy is wide ranging. The sector can contribute immensely to the empowerment of farmers, especially females, by providing improved bargaining power to them, leading to reduction in distress sales and ensuring steady supply to the processors.

In talking of inclusive rural growth, the potential for the food processing industry to drive growth and employment is immense. At present, the sector constituted as much as 8.98 percent and 11.11 percent of GVA in the manufacturing and agriculture sectors respectively. It employs the largest number of persons, not just in the formal sector, where it constitutes 12.38 percent of registered employees, but also in the informal sector.

The importance of the food processing industry cannot be overstated as it is the link industry between agriculture and manufacturing. Building up processing capabilities, especially basic and primary processing at the farm level can enhance incomes. There is a strong argument for increasing inclusivity of economic growth as well. It has been estimated that 70-80 percent of rural women are involved in agriculture, playing roles of cultivators, entrepreneurs, and labourers. As per the Ministry of Food Processing, women's share of employment in registered food processing industries stood at 12.6 percent of total employment, whereas the number in the unregistered industries was almost a double and stood at 24.7 percent. The Food Processing sector holds the potential to infact empower women by creating avenues for entrepreneurship and employment. However, within this sector also, differential access of women to resources is something which needs to be addressed.

Based on this evidence, it can be concluded that it is important to promote the food processing sector, not just because of its direct spillover effects, but also the indirect effects of improving India's socio-economic conditions. However, relative to its potential, India is under-performing in terms of growth in the food processing industry and exports. Policy interventions will be crucial in unlocking these bottlenecks.

Consumer demand is increasingly shifting towards processed products. Increasing consumption, with rising incomes, is seeing demand for branded products rise as well demand for healthier products. Growth of organised retail, are other drivers of consumer demand in this industry. Globally, the demand in developed markets is skewed towards value added, processed products. Exporting raw produce still requires primary processing to preserve their freshness during transport.

However, it would also be fair to say that while significant strides have been made, there is a sense that India is performing below its latent potential of becoming a food export hub in the post-pandemic era. Despite being the second largest producer of cereals, fruits and vegetables

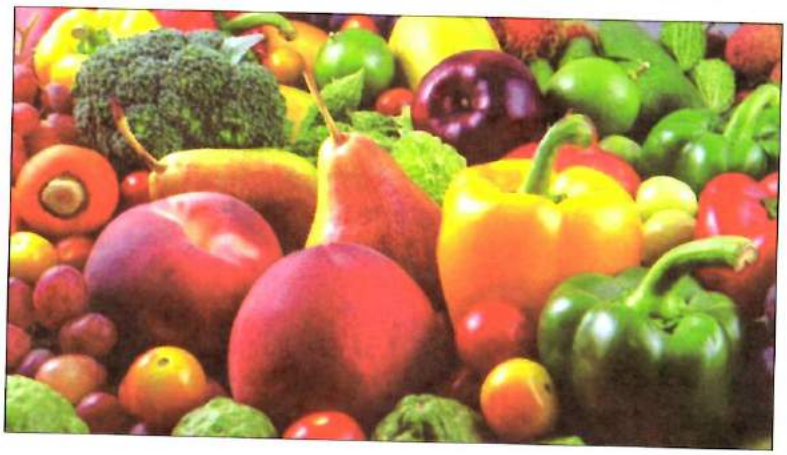
and fish and in fact the largest producer of milk, however, when it comes to processing this produce, India processes less than 10 percent of its total output. The number is lower at 2 percent in the case of fruits and vegetables, and 6 percent poultry. The numbers are higher in meat products (21 percent) and marine products (23 percent). However, at this stage it is important to make a distinction between primary and secondary processing. Whilst India's primary processing capabilities are well-developed (eg: turning wheat to flour), the secondary processing market, where higher value addition takes place (eg: tomatoes to ketchup) lacks scale and penetration.

Exports also remain below potential. Despite India being one of the largest producers of agricultural commodities in the world, agricultural exports as a share of total exports are low in India (10 percent of India's total exports globally top 5 exporting nations account for 34 percent share in export of food products). India is 14th largest exporter in the world with only 2 percent share in global export of food products. At present, India's agricultural exports predominantly consist of raw materials, which are then processed in other countries, again indicating the space to move up the value chain. India's processed food products exports have remained low and continue to be dominated by low value-added products. Furthermore, the industry experts feel that the Indian products are non- competitive in terms of price and quality in the export market.

Interventions are required across the value chain to tap this latent performance. At the farm level, due to lack of awareness among the producers, the output lacks quality and safety standards. There is also a lack of processable varieties which is another bottleneck. Aggregation centers close to the farmgate are also lacking. Procurement and aggregation of produce at a large scale was disincentivised by prevalent agriculture marketing regulations, as numerous government committees and reports had noted. Private investments were lacking. As a result, huge gaps exist in the cold chain. While India has developed many cold storages, there is a lack of intermediate infrastructure. Huge gaps exist in the number of packhouses, where produce is graded and sorted, critical for quality control. Gaps exist in the availability of refrigerated vehicles to transport perishable produce. Combined with inefficient and ineffective post-harvest management at the farmgate level, the annual loss of produce has been estimated to be in excess of Rs. 90,000 crores.

Recognising the importance of the food-processing industry, several initiatives have been undertaken to boost growth and employment. First, the agriculture reforms announced in 2020 have the potential to unlock bottlenecks in procurement by processors and exporters. Direct selling by farmers and contract farming can help create more backward linkages between the food-processing and exports sector. These steps taken to liberalise agriculture markets must be seen in conjuction with a host of other steps, indicating a holistic approach towards development of the agriculture and food processing sector.

Dedicated funds have been launched to develop infrastructure at all levels. The Agriculture Infrastructure Fund (AIF), with a corpus of Rs. 1 lakh crore, aims at developing infrastructure at the farmgate level and aggregation points, boosting pre-processing and primary processing capabilities. In the Budget Speech, the AIF was extended to APMC market yards as well, boosting infrastructure in the mandi system as well. Similarly, a dedicated Animal Husbandry Development Fund and the Pradhan Mantri Matsya Sampada Yojana have been launched as part of the AatmaNirbhar Bharat Abhiyaan. Another important intervention is the formation of 10,000 Farmer producer organisations (FPOs). FPOs offer the benefits of aggregating farmers, with a modern corporate structure, allowing the spirit of cooperatives, that



drove India's White Revolution to be maintained with more transparency and accountability. Aggregating farmers in through FPOs enhances their bargaining power, both in terms of purchasing inputs and also selling their produce. Small and marginal farmers, who often lack bargaining power at both the inputs and outputs side, can be empowered through FPOs. It is pertinent to note that 85 percent of India's farmers are either small or marginal, so the benefits are likely to acrrue at the bottom of the pyramid, as intended.

In terms of developing large scale capabilities, the Pradhan Mantri Kisan Sampada Yojana was launched a few years back. In 2020 alone, 46 food processing projects were operationalised. With an outlay of Rs. 10,000 crores, the PM – Formalisation of Micro Food Enterprises (PM-FME) scheme was launched. The One District One Product (ODOP) is being effectively leveraged as well. The Operation Green was extended from tomatoes, onions, and potatoes to 22 perishable commodities. In terms of foreign investment, 100 percent FDI is allowed under automatic route in food processing industries, 100 percent FDI in manufacture of food products and for trading (including e-commerce). Cumulatively $10 Bn worth of FDI equity inflows have come to the food processing industry between April 2000 and December 2020. FDIs can bring in the much-required tech infusion across the value chain which can help reduce wastage, maintain quality, and enhance shelf life of food products. Fiscal incentives to domestic industry include income tax exemptions and capital investment support.

Sustainability is another factor and that must be given equal importance to production. Depleting soil health and water tables have the potential to impact production and hence food security going ahead. Interventions are required to shift towards more sustainable forms of production, such as substituting flood irrigation with micro-irrigation, promoting balanced use of fertilisers and judicious use of pesticides. Since the Green Revolution, India has ensured food security. The technologies being promoted since then have led to increasing land productivity. High yielding varieties of seeds, expansion of irrigation, use of fertilisers and pesticides were encouraged to boost productivity and production. The outcome was food security for a previously food scarce nation. However, over time it has emerged that other outcomes have not been as favourable for the nation. Agriculture incomes have grown at a slower pace than non-agriculture incomes, widening the income gap. With 85 percent of India's farmers falling into the small and marginal category, the ideas of the Green Revolution were best applicable to larger farms than smaller ones, as mechanisation became a viable prospect.

There is also mounting evidence of environmental damage being caused by prevalent agriculture practices. Inefficiency in water use has led to water stress in several parts of India. As per the Central Ground Water Board's (CGWB) assessment in 2017, nearly 90 percent of all groundwater extracted annually went towards agriculture. Overall, as a percent of annual extractable groundwater resources, India was extracting 63.3 percent. The situation in individual states is more alarming. Punjab was extracting 166 percent of their annual extractable resources, leading to depleting water tables. Haryana at 137 percent is in a similar situation. Imbalance in fertiliser use is another area that is leading to environmental damage. Consumption is skewed towards nitrogenous (N) fertilisers over P & K. The fertiliser response ratio has fallen by over 3 ½ times since the 1970s, necessitating a further expansion of fertiliser use. This also leads to rising input costs for farmers. The policy paradigm in agriculture since the Green Revolution has ensured our food security, but not nutritional security. 39 percent of Indians remain undernourished. Diversification of farm produce and investments in the cold chain are critical. As per research from the Tata-Cornell Institute, there are two key pathways through which agriculture impacts; nutrition. The first pathway is through which increase in household incomes lead to better nutritional outcomes, through access to more diverse diets, better healthcare, better education etc. The second pathway is through which increase in incomes unlock access to a more diverse diets, which is directly correlated to higher nutritional outcomes.

The changing demands of a growing population necessitate an increase in productivity and diversification of farm produce. The effects of climate change are going to be substantial as well. The Intergovernmental Panel on Climate Change (IPCC, 2014) has predicted significant reduction in crop yields, to the tune of 10 to 25

percent by 2050. If adaptation and mitigation strategies are not adopted, our hard-won gains in food security and poverty stand to be reversed. So, India needs to increase productivity, but the current policy paradigm would only accelerate the impact of climate change. Hence, in the current system, productivity often comes at the expense of sustainability and environmental impact. At the same time, there are models which can help increase productivity, sustainability and enhance farmer incomes, rooted in the principles of agroecology which can be identified, documented, and scaled up.

Tech based innovative solutions go a long way in ensuring the progress of any sector. It is a well-known fact that the agriculture and food sector is facing multiple challenges, digitisation might as well be a part of the solution. In India, there exists a vibrant Agri-Tech ecosystem. There are start-ups providing solutions across the entire value chain - from Crop Advisory to Farming as a Service (FaaS) and from Agri-logistics to Financial services. The sector can experience tremendous growth in the coming few years if tech driven solutions are embraced as they highly optimise and individualise the management of resources. In scaling these solutions, partnerships with corporate and the government will play an extremely critical role.

To ensure robust development of the sector, the demand side requires a sharp focus. But with lifestyle becoming fast-paced, a change in consumption behaviour can be seen wherein more and more consumers are shifting to processed food options. Consumers are increasingly demanding healthier options and traceability in their produce; therefore, the product development can be made consumer centric by taking the same into consideration.

Right now, the food processing industry is largely domestic oriented, with exports accounting for only 12 percent of its total output. There is a huge potential abroad which still needs to be tapped. For this, the production needs to be made export oriented. This would require adherence to global quality standards. While there are many globally accepted quality standards such as Codex Alimentarius standards, many developed countries have relatively stringent health standards than the internationally accepted ones to protect their nations against possible health hazards from imports from developing countries. Another aspect of it is to ensure traceability. Improving traceability in food processing not only helps in ensuring food safety, but also optimises business performance. The production techniques for traditional foods can be standardised to ensure uniformity and minimum wastage during the process and can go a long way in the generation of demand.

Lack of consumer awareness is one of the major bottlenecks faced by the industry. While some of the food items like Kale, Oats etc. are widely regarded as nutrient dense foods, their alternatives are known only by a few. In this regard, Indian 'Super Foods' can be promoted as alternatives to the prominent healthy food products. For instance, Amaranth can be promoted against Quinoa, Buckwheat against Oats and Beet Greens against Kale. This would drive their demand and provide much desired impetus to the development of necessary infrastructure to augment the industry. Private investment will have to play an important role in linking rural India to large domestic and international markets.

The impact of the food processing sector on the economy is wide ranging. The sector can contribute immensely to the empowerment of farmers, especially females, by providing improved bargaining power to them, leading to reduction in distress sales and ensuring steady supply to the processors. It provides farmers the access to formal lending, apart from support from various government schemes. It also enables them to capture value through on-farm pre-processing and processing activities, resulting in reduced wastage. With the growth of the sector, off-farm employment will be generated right across the value chain, providing a lucrative avenue for employment generation in the country. As high export potential will be tapped, the domestic industry will also see growth, leading to an overall economic growth. Yet, at the same time in pursuit of increased production and productivity, sustainability will have to play an equally important role to ensure our food and nutritional security going ahead.

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PMGSY: Road to Prosperity

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Rural roads have multiplier impact on poverty reduction and raising living standard of rural people. To address lack of adequate connecting roads in rural areas, Pradhan Mantri Gram Sadak Yojana (PMGSY) was introduced as a key scheme in 2000. In last twenty years, the scheme has emerged as instrumental in connecting villages,enhancing availability and accessibility of basic services, played role in reducing poverty, as well, shift in livelihood opportunity and enhanced the standard of living of the rural India.

The necessity of a proper road network for the development of the country was understood quite early in India. In the first 20-year road development plan of India, in the year 1941, roads have been classified into five categories, namely, National Highways (NH), State Highways (SH), Major District Roads (MDR), Other District Roads (ODR) and Village Roads (VR). Out of them the ODR and VR are being categorised as rural roads. In the third road development plan (1981-2001), new accessibility criteria for village road were introduced and several approaches for rural road development were suggested (Sarkar, 2007). The rural roads are not only key to raise living standards in poor rural areas, they are also instrumental in reducing isolation, vulnerability and income variability (Van de Walle & Cratty, 2002). They are also considered as backbone for the development of rural economy (Manjunath, 2012). Rural roads have not only multiple impact upon economic and livelihood pattern of rural economy but also found to have multiplier effect on people's income. Public investment in roads have largest impact on poverty. It has been found that, in India, with an increase in investment in rural roads by Rs. 100 billion, the incidence of rural poverty reduced by 0.87 percent. For each Rs. 1 million investment in roads, 165 rural people would be lifted above poverty line (Fan, Hazzel, & Thorat, 1999). This is also argued that impact on poverty reduction through this investment in rural roads is twice effective than agriculture, which is

second-best alternative of government spending. Not only that, the rural roads also enhance scope of employment in non-farm sector. This increased non-farm employment and higher rural wages also enhance incomes of the rural poor and consequently, reduce rural poverty (Fan, Hazzel, & Thorat, 1999). The rural roads also found to be important in creating a conductive macroeconomic environment for growth that allows agents to make choices that enable them to locate as close to their production-possibility frontier as possible (Aggarwal, 2018).

However, in 2001, half of India's 60,0000 villages, did not have paved road (Asher & Novosad, 2020).To address the issue, the then Government of India launched the Pradhan Mantri Gram Sadak Yojana (PMGSY) in December, 2000 as a key programme of Ministry of Rural Development (MoRD) to provide road connectivity in rural India. The basic objective of the PMGSY was to connect all habitation with population of more than 1000 with all-weather roads by 2003. By 2007, it aimed to connect all the habitation with greater than 500 population in plain areas and greater than 250 persons in desert, hilly and tribal areas. To facilitate connectivity, PMGSY permits both, construction of new roads as well upgradation of existing roads with a priority to provide connectivity to unconnected habitation.

Implementation Strategy of PMGSY

For PMGSY, a hamlet or habitation is considered as unit of implementation decision to get connected. For selection of hamlet or habitation, the population recorded in 2001 census is taken into account as base. The population of all habitations within a radius of 500 metre (1.5 km of path distance in case of hills) may be clubbed together to determine the population size. In the blocks bordering international boundary in the hill states (as identified by the Ministry of Home Affairs), however, all habitations within a path distance of 10 km may be treated as a cluster for this purpose. A special dispensation has been allowed to Arunachal Pradesh under PMGSY by extending the cluster approach to all international border districts in the state by clubbing population with the path distance of 10 km and treating as a cluster (www.pmgsy.nic.in).In implementation of PMGSY, Ministry of Rural development (MoRD) is the concerned Nodal Ministry at the centre. The National Rural Road Development Agency (NRRDA) has been set up on January 10, 2012 to provide management and technical support to the states in implementing PMGSY. At the state level, the State Rural Road Development Agencies (SRRDA) monitor PMGSY works, which are implemented by Public Works Departments (PWD), or Rural Development Department and similar agencies. To implement construction of rural roads in different parts of the country, different agencies/contractors get selected. To make the process transparent, e-tendering and e-procurement process have been made mandatory, and agencies, having required qualification and capacity only are allowed to participate in the bidding.

To ensure quality and sustainability of every road constructed, it is prescribed that the contractor is required to establish a field laboratory in every package of roads and required to test quality of materials and workmanship under supervision of executing agency. Where, Independent Monitor has been deployed by concerned state government, the central government also deployed National Quality Monitor (NQM) for monitoring of implemented works. The guidelines related to PMGSY is dynamic in nature, it gets revised time to time based on the feedback on monitoring experience (Government of India, 2021). To bind the contractors for superior quality, it is prescribed to create provision in the contract to make the contractor liable for any defect that may occur until five years after completion of the road network (Government of India, 2021).

Special Initiative for North Eastern State and Left Wing Extremism Affected Areas

Special attention has been given to North Eastern states due to their strategic location and climatic position. Financial burden of these states have been eased. Similarly, in order to provide seamless connectivity to difficult and remote areas which are also affected by Left wing Extremists (LWE) violence, the government has started a special project with effect from December 2016, as a vertical under PMGSY known as 'Road Connectivity Project for Left Wing Extremism Affected Areas (RCPLWEA)'. This special initiative started in 44 identified districts, affected by LWE, which are scattered in 9 states. The primary focus

of this project is to reduce the level of physical and functional isolation of human beings via improving the road connectivity. Create suitable road connectivity aimed to build up confidence of citizens in the governance structures, create job opportunity, uplift living standard and help to keep the local population away from the LWE activities. Another objective was to smoothen anti-LWE operation in those areas through enhanced connectivity (Government of India, 2021).

People's Participation and Grievance Redressal

To ensure local people ownership of roads through local institutions, the provision for transferring the roads to local Panchayati Raj Institution has been created after five years of completion of works. Till the time of being taken over by the Panchayati Raj Institutions, the project implementing unit will continue to be responsible for administration of post construction and zonal maintenance. A unique initiative has been taken to involve local self-help groups to ensure community participation in monitoring. This initiative expected to not only ensure community ownership at also to empower local women. In some states, like Madhya Pradesh, Uttarakhand, Himachal Pradesh this initiative has started (Government of India, 2021).

To ensure citizen participation in quality implementation, the provision for complaint by citizen has been created. A citizen can make any complaint regarding implementation and quality through offline or online mode. For effective and time bound monitoring through citizen, a Centralized Public Grievance Redressal and Monitoring System (CPGRAM) has been developed. At central level, National Rural Infrastructure Development Agency (NRIDA) reviews the grievances and forwards to the concerned state for necessary action. 'Meri Sadak' app also has been introduced in 2015 to boost up monitoring from citizen. Citizen can lodge complaint with photographs through this app even in their chosen language.

New Initiatives

Online Monitoring

The Online Monitoring and Management System (OMMS) has been introduced and being used for effective management and monitoring under the programme. The required data are entered by the field level staff and the State units under this web-based package. The detail data are available in the web sites of www.omms.nic.in and www.pmgsy.nic.in.

Introduction of eMARG

In 2019, the Ministry has launched Electronic Maintenance of Rural Roads under PMGSY (eMARG) in all states. e-MARG is an initiative of smart application of information technology which integrate data across the department and monitor maintenance status of rural roads and suggest necessary action.

Use of Green Technology

To promote green technology, PMGSY has issued guidelines to use new material/waste material/locally available materials to build roads. National Rural Infrastructure Development Agency issued details 'Guidelines on Technology Initiatives' in 2013 to adopt green technology. Till December 2020, a total road length of 84875 km has been sanctioned under this and out of this 46064 km of roads have been built (Government of India, 2021).

Financial Incentives

Since 2016-17, best performing states are being encouraged with additional financial incentives. The recipient states shall use this fund for periodic maintenance of roads constructed under PMGSY.

Evolution of PMGSY

Launching of PMGSY-II

In May 2013, the Central Government launched PMGSY-II to consolidate the existing rural road network and to improve it overall efficiency as a provider of transportation services to people, goods and services. The basic objective was to enhance the economic potential of rural India and make rural economic hubs through enhanced connectivity. PMGSY-II focuses on upgradation of existing rural roads, selected based on their potential to facilitate growth and development of rural economy through better connection with markets for goods and services. PMGSY-II was adopted through sharing financial burden between the central government and states. It was proposed to cover overall 50,000 km road length by up-gradation. The cost will be shared between the Centre and the States/UTs on 75:25 for the Plain Areas and 90:10 basis for the Special Areas. Later on, the fund sharing pattern was changed

to 60:40 for plain States and 90:10 for special category States and hill States (Government of India, 2021).

Launching of PMGSY-III

In December 2019, the Government of India launched PMGSY-III for consolidation of through routes and major rural links connecting habitation, as well as, rural markets, educational institutions, health institutions etc. Through PMGSY-III, use of modern technology in planning and implementation has been introduced. Geo referencing and geo-tagging of rural facilities are done through the app GEO-PMGSY and 'trace maps' are prepared highlighting important facilities in villages and shortest routes to connect them, and identify roads which may be upgraded through PMGSY-III to make villages economically efficient.

Achievement of PMGSY

Till December, 2020, a total 644915 km road length has been sanctioned under new connectivity and up gradation component under PMGSY-I, out of which 598232 km road length has been completed (Government of India, 2021). Detail year wise progress has been given in Table 1. Under PMGSY-II, a total of 50000 km road length has been targeted for upgradation, out of this, a total of 49714 km road length has been sanctioned under and 38883 km length of road completed till December 2020 (Government of India, 2021). Under PMGSY-III, road length of 125000 km targeted to be consolidated by 2025. However, a total length of 32928 km road has already been sanctioned to 12 states and 1886 km road length has been completed till December 2020 (Government of India, 2021)

Financing and Expenditure PMGSY

The PMGSY programme was started in the year 2000 as 100 percent Central Sponsored Scheme. Though rural road is a state subject, but it was realised that finances of state government will not be adequate to fund a programme of this magnitude. With a departure from the normal condition where cost is shared between central and state, a conscious decision was taken to allocate 100 percent central funding for the programme (Manjunath, 2012). However, in 2015-16 the funding pattern has been modified to 60:40 between the Centre and the State, except 8 North Eastern and 3 Himalayan states for which the ratio was fixed at 90:10. This pattern of financing was based on recommendation of the Sub-Group of Chief Ministers on Rationalisation of Centrally Sponsored Schemes. The sources of fund for PMGSY as indicated are (i) Cess on High Speed Diesel, (ii) Budgetary Support, (iii) Asian

Table 1: Progress and Achievement under PMGSY

Year	Expenditure (Rs. In Crore)	Proposals Cleared	Habitations Connected	Length Connectivity (Km)
2004-05	3091.38	1833.2	17602	66975
2005-06	4100.39	9203.9	25804	89866
2006-07	7304.27	19384.67	36605	120576
2007-08	10619.26	24374.5	47941	161807
2008-09	15161.98	37762.95	62416	214212
2009-10	18832.92	6590	70293	274329
2010-11	14910.98	6768.33	77877	319438
2011-12	10949.41	9188.46	84414	350501
2012-13	8386.75	27013	91278	374663
2013-14	13095.29	31746.74	97838	399979
2014-15	17144.06	2355.77	108668	436316
2015-16	16542.9	3307.36	116310	472695
2016-17	16093	30532.94	124709	504727
2017-18	17307.4	30857.02	137877	550601
2018-19	23363	28562.29	171469	598857
2019-20	14292.59	15816.44	175560	626101

Source: Annual Reports (2004–2020), National Rural Infrastructure Development Agency, Ministry of Rural Development, Government of India

(contd. on pg. 28

PM's Address to the Nation

Highlights

- Government of India to provide free vaccine to all Indian citizens above 18 years of age
- 25 percent vaccination that was with states will now be undertaken by Government of India
- The centre will buy 75 percent of the total production of the vaccine producers and provide to the states free of cost
- Pradhan Mantri Garib Kalyan Anna Yojana extended till Deepawali
- Till November, 80 crore people will continue to get free food grain every month
- Supply of vaccine is to increase in coming days
- Vaccines for children and nasal vaccine under trial

Prime Minister Shri Narendra Modi addressing the nation on June 07, 2021.

Prime Minister, Shri Narendra Modi addressed the nation on June 07, 2021. He expressed condolences for the people who lost their lives in the pandemic. Terming the pandemic the biggest calamity of last hundred years, a pandemic not seen nor experienced in the modern world, he said, the country fought the pandemic at many fronts. As many states came forward with a demand for reconsideration of the vaccination strategy and for bringing back the system that was there before 1st May, he announced that it has been decided that the 25 percent vaccination that was with states will now be undertaken by the Government of India. He announced, that 21st June onwards, the Centre will provide free vaccine to all Indian citizens above 18 years of age. The Government of India will buy 75 percent of the total production of the vaccine producers and provide to the states free of cost. No state government will be spending anything for vaccines. Till now, crores of people got free vaccine, now 18 years segment will be added to this. Government of India will provide free vaccines to all the citizens, reiterated the Prime Minister.

Shri Modi informed that the system of 25 percent vaccines being procured directly by the private hospitals will continue. State governments will monitor that only 150 rupees service charge is levied by the private hospitals over the decided price of the vaccines.

In another major announcement, the Prime Minister conveyed the decision of extension Pradhan Mantri Garib Kalyan Anna

Yojana till Deepawali. This means that till November, 80 crore people will continue to get decided amount of free food grain every month.

Recalling the unprecedented rise in the demand for the medical oxygen during the second wave during the months of April and May, he said, the challenge was met at the war footing deploying all the systems of the government.

The Prime Minister said, globally, vaccine producing companies and countries are far less than what is the global demand for the vaccines. In such a scenario, made in India vaccine was critical for India. Shri Modi pointed out that in the past, India used to get vaccines decades after they were developed abroad. This always resulted in a situation in the past where India could not even start vaccination while other countries used to finish the vaccine work. She Modi said, we not only enhanced the speed but also widened the ambit of vaccination. Prime Minister Modi said, this time, India warded off all the apprehensions and, through clean intentions, clear policy and constant hard work, not just one but two made-in-India vaccines for Covid were launched in India. Our scientists proved their calibre. Till today, more than 23 crore vaccine doses have been administered in the country.

The Prime Minister recalled that Vaccine Task force was constituted when there were just few thousand Covid-19 cases and vaccine companies were supported by the government in all possible ways in trials and funding for research and development. The Prime Minister informed that due to great effort and hard work, supply of vaccine is about to increase in coming days. He conveyed that, today, seven companies are producing different type of vaccines. Trials of three more vaccines are in the advanced stage, informed the Prime Minister. The Prime Minister also talked of trials for two vaccines for children and a 'nasal vaccine'.

(Source: Press Information Bureau)

(contd. from pg. 25)

Development Bank Loan and (iv) World Bank Loan (Government of India, 2021).

Since inception in the year 2000, a large sum of money has been allocated and spent on PMGSY. The chart-1 gives a glimpse of year wise expenditure under PMGSY.

Impact of PMGSY on Rural Development

Rural roads are the basic infrastructure requirement and play a vital role in socio-economic upliftment of rural community. They contribute significantly in rural development by creating opportunities to access goods and services located in nearby villages or major town/market centres.

Impact on Income and Poverty

The implementation of PMGSY has brough significant impact in the lives of the poor in Indian villages. It is found that over the period of 2005 to 2009 the program has caused 0.1 to 1.4 percentage point reduction in the rural poverty rate (Renkow, 2010). It has also been found that with new roads in rural areas new/ additional employment and business opportunities has been generated. Time saving due to new connecting road is resulting in better access to employment and business opportunities. Along with this, it has been found that, due to implementation of rural roads there is a shift in distribution of primary source of income from cultivation and self-employment to unskilled wage labour (World Bank, 2014).

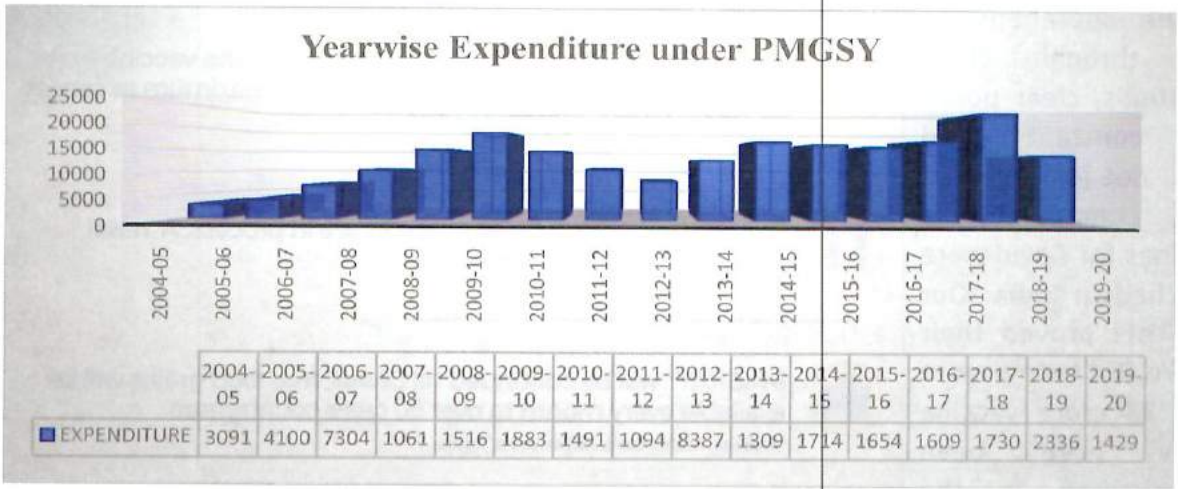
Increase in Rural Accessibility

PMGSY has connected villages which has increased rural accessibility. Studies found that construction of new roads based on population criteria as used in PMGSY programme increases the overall accessibility in region, though the impact is more in areas with high population density (Kanugantia, Sarkar, & Singh, 2016). It is also found that, with the introduction of PMGSY, the traditional transport mode has been replaced by motorised vehicle, which has made the transport service quick and efficient. This increase in accessibility has caused enhancement in value of land in remote areas. (Biswas & Anwaruzzaman, 2018).

Impact on Livelihood

Study has pointed out that the rural roads, constructed under PMGSY has made access to markets easier for the farmers, which has improved information and extension services and also impacted the cultivation choices and thereby resulted in positive changes in cropping patterns. It is found that the reliance on traditional crops like cereals and pulses has reduced and many farmers have shifted to more cash crops like fruits, vegetables etc. It is also found that with the construction of PMGSY roads, villagers can smoothly access chemical fertilisers, HYV seeds, pesticides, insecticides, herbicides etc. which might have caused increase in production of existing crops. As well as there have been a shift in the cropping pattern from traditional food crops to vegetable and fruits (Biswas & Anwaruzzaman, 2018) and there has also been shift of livelihood pattern from cultivation to unskilled non-farm work (World Bank, 2014). Activities like livestock rearing and use of modern agricultural equipment, found

Chart 1: Year wise Expenditure under PMGSY



	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
EXPENDITURE	3091	4100	7304	1061	1516	1883	1491	1094	8387	1309	1714	1654	1609	1730	2336	1429

Data Source: Annual Report 2020, Ministry of Rural Development, Government of India

to bring higher prices and created employment opportunities (Government of India, 2015). It has been estimated that, during 2005 to 2009 the agricultural GDP has grown by between Rs 164 billion to Rs 656 billion due to construction of rural roads through PMGSY (Renkow, 2010). Along with crop diversification and allied activities, the roads has opened up avenues for more employment generating options through better business activities, as it has widen the scope in non-farm employment opportunities.

Impact on Health and Education

There is huge improvement in health service accessibility. The construction of PMGSY roads has certainly eased the approachability to medical facilities (Kanugantia, Sarkar, Singh, & Arkatkar, 2015). The reduction in travel time to health centre, pre and post natal care, increase in institutional delivery and more frequent visit of doctor and health workers in villages; have created positive impact on health outcome of rural India (Government of India, 2015). The rural roads proved to be roads to lower morbidity of local people. The probability of falling sick and number of days of sickness reduced with the length of the roads. The roads also played a role in promoting higher income of households leading to better nutrition and higher education for women (Bell & Van Dillen, 2018). Better nutrition from enhanced income and the girls reaching motherhood being better educated, have worked positively in this direction. PMGSY has enhanced all seasoned accessibility of schools in rural areas, and it is found that 15 percent of the habitations provided connectivity under PMGSY have reported increase in number of schools post PMGSY (Government of India, 2015). The construction of roads have significantly increased enrolment among middle-school children, who are more at risk of leaving school. It is estimated that connecting a village with a new paved road has increase enrolment in middle school by 7 percent points after two years road construction (Adukia, Asher, & Novosad, 2020).

Challenges and Suggestions

Rural roads not only have multiplier effect on rural development, they play role of a catalyst in shifting lives of poor of rural areas through better connectivity and ensuring better access to health, education and other basic amenities. Keeping the 2001 census data for selecting villages is often criticised and needs more updated database for selection of villages. A special initiative may be taken to include low population villages to connect with roads. As maintenance of existing roads is a challenge, along with connecting villages, attention also should be given to quality of roads for sustainable use as well timely maintenance of roads undertaken by using the current arrangement efficiently. Not only constructing roads, the true impact of the PMGSY roads would be achieved when public transport service, which are often missing, become available in the villages (Kanugantia, Sarkar, Singh, & Arkatkar, 2015).

Arrangement for public transport in connected villages is required to reap better

benefit of the rural roads. Active participation of the administration and stakeholders need to be ensured for long lasting benefits of the program to the people in general (Yuvaraja & Jayarama Bhat, 2011). To make the benefit sustainable, intervention of urban centres bordering the villages would be instrumental in change in livelihood pattern of the villagers from farm to non-farm be sustainable (World Bank, 2014).

Conclusion

After twenty years of implementation, the PMGSY programme, has emerged and evolved to be a key scheme for rural development. It has made significant change in connecting rural areas and through which, livelihood, agriculture pattern, health, education and lives of people have been shaped in positive way. Throughout the years it has not only emerged as a key scheme and enhanced connectivity in rural area, but the scheme also has changed itself, incorporated required changes, adopted cutting edge technology for efficient implementation to evolve as an engine of growth to change lives of people in rural India.

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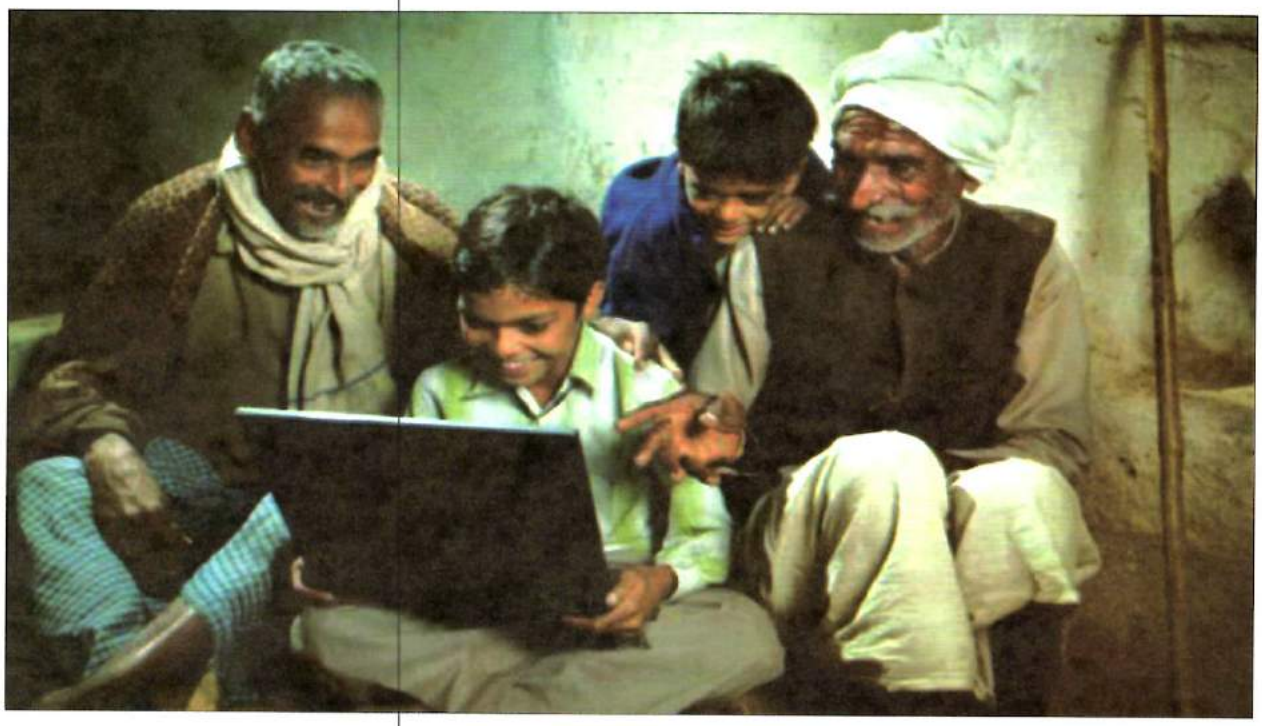
Digital India : Towards a Connected Nation

Vishnu Sharma

The launch of 'Digital India' has opened a wide spectrum for societal transformation. Digital India aims to ensure that government services are available to citizens electronically and public accountability is ensured through mandated delivery of government's services electronically. Digital India is playing a revolutionary role in connecting India by bridging the rural and urban India divide. Its vision is to transform India into a digitally empowered society and knowledge economy.



For the overall development of any country, development of its infrastructure is pertinent. More so, in a country like India where more than 60 percent of its population still lives in its countryside, the development of its rural infrastructure becomes absolutely vital for rapid growth. Rural infrastructure is important for agriculture development, curbing rural poverty and sustainable growth while giving push to agro industries. Today, rural India's contribution to our national income is estimated to be more than 45 percent and according to various reports, by the year 2050 more than half of our population will still be living in rural areas. Therefore, centre and state government have over all estimated a total capital expenditure of 773915 crore rupees between fiscals 2020 and 2025 on rural infrastructure development.

Indian government's Digital India programme, which was launched by Prime Minister Shri Narendra Modi in July 2015, is playing a revolutionary role in connecting India by bridging the rural and urban India divide. Its vision is to transform India into a digitally empowered society and knowledge economy by providing broadband highways, universal access to mobile connectivity, public internet access programme, e-governance, e-Kranti, information for all, electronics manufacturing, IT for jobs and early harvest programmes. Digital India also aims to ensure that government services are available to citizens electronically and public accountability is ensured through mandated delivery of government's services electronically.

History of initiatives for e-governance dates back to 1990s. During that period, the government introduced major Information and

Communications Technology or ICT initiatives which included railway computerisation, land record computerisation etc. These initiatives mainly focused on the development of information systems. Later on, many states started ambitious individual e-governance projects aimed at providing electronic services to citizens.

Though these e-governance projects were citizen-centric, they could make less than the desired impact due to their limited features. The isolated and less interactive systems revealed major gaps that were thwarting the successful adoption of e-governance along the entire spectrum of governance. They clearly pointed towards the need for a more comprehensive planning and implementation for the infrastructure required to be put in place, interoperability issues to be addressed etc.; to establish a more connected government.

Thus, the launch of Digital India opened a wide spectrum for societal transformation. The overarching mission works in partnership with multiple departments and ministries where in each individual programme stands on its own, but also is a part of the larger vision. According to the government, Digital India efforts are laid down to achieve results in two key focus areas:

a. **Governance and Services on Demand**

   Digital India aims to integrate processes and information across departments and jurisdictions seamlessly so to help provide real-time services to citizens both on online and mobile platforms, digitally enable processes for businesses, creating a digitally enabled cashless economy and creating cloud-based repository for easy access for the citizens as well as better planning and decision-making with the help of GIS.

b. **Digital Empowerment of Citizens**

   The programme aims to provide digital literacy and digital services to all citizens through universally accessible digital resources and services in several Indian languages and introduction of collaborative digital platforms, availability of all documents and certificates online and availability of all entitlements through cloud.

Accordingly, the government has taken some key initiatives which include:

Aadhaar Enabled Payment System (AEPS)

Developed by the National Payments Corporation of India (NCPI), AEPS is a payment service based on an individual's Aadhaar card (one can use Aadhar card instead of debit or credit cards) which enables the owner of the card to make financial transactions such as transfer funds, make payments, deposit cash, make withdrawals, etc. According to NPCI, the platform saw 208 million transactions up until October 2019.

MyGov

MyGov platform promotes participatory governance by providing citizens an opportunity to voice their opinions in policy making and recommendations. The platform provides a thriving space for discussions, tasks, talks, interactive polls and blogs on diverse issues related to governance and public policy. It currently has more than 9.5 million users engaged in various activities, with more than 10000 posts every week, which are collected, analysed and shared with the concerned ministries and departments.

National Mission in Education through ICT (NMEICT)

The NMEICT is a centrally-sponsored scheme which aims to leverage the potential of ICT in education through teaching and learning processes in institutions for higher education. Under this mission, the government aims to use ICT interventions to bolster enrolment rates in higher education by creating a proper balance between the right content, undertaking research in imparting education and other critical areas, and increasing connectivity among other nations to share our progress and exchange of ideas. The aim of the mission is to accomplish these goals by creating and delivering valuable content through the content delivery portal Sakshat and, by avoiding recreating content that is already available online freely. The content is also aimed to be dispersed through EduSAT and Direct to home platforms. NMEICT has a vision to service more than 50 crore working population with the opportunity for continuing education through interactive, personalised knowledge modules that suit the users' needs and aspirations.

Pradhan Mantri Jan-Dhan Yojana (PMJDY)

The PMJDY is a scheme under the National Mission on Financial Inclusion for the impoverished

citizens of India. It provides access to services of financial nature at affordable rates to boost financial inclusivity and encourage savings. The services accessible under the PMJDY are savings accounts, loan services, pension, insurance, etc. As on January 2021 a total number of 41 crore 75 lakh Jan Dhan bank accounts have been opened.

SMART Cities

The Smart Cities Mission under the Digital India umbrella promotes conceptualisation and realisation of cities that have a strong basic infrastructure and promote sustainable, safe and inclusive development for its residents by availing clean, sustainable environment via application of 'Smart' solutions. As part of the initiative 99 cities have been selected to address issues of pollution, increasing crime rates, congestions, poor living standards by creating better administrative and infrastructural systems through new technological. The Budget for the year 2019-2020 is estimated to be 6450 crore rupees.

E-Pathshala

NCERT's e-Pathshala is a platform to disseminate educational resources through mobile app and website. The platform offers educational resources, including NCERT textbooks for classes 1-12, audio-visual resources by NCERT, periodicals, supplements, teacher training modules and a variety of other print and non-print materials.

E-Prison

This project envisions digitisation and integration of all activities that are related to prison and prisoner management for jails through an application suite. The suite is developed by NIC as a cloud-based product designed to be a one-stop solution for citizens to digitally apply for visitation, note grievances, use a portal for buying goods created by prisoners, etc. For the prison management system, the project aids in surveillance and management of prisoners, administrative tasks, resource optimisation, etc.

Farmer Portal

The portal is designed to be a one-stop destination to gain relevant information related to agriculture, risk management, animal husbandry, aquaculture, weather, programmes and schemes.

Goods and Services Tax Network (GSTN)

The GSTN manages the IT system of the GST portal and acts as the backbone of the GST system and acts as the core database for it. The network helps the government follow financial transactions and helps the tax-payers with GST registration, maintenance of tax details, etc. During the Budget 2020 speech, Finance Minister Nirmala Sitharaman said, "deep data analytics and AI tools are being used to crackdown on GST input tax credit, refund and other frauds and to identify those trying to game the system. Invoice and input tax credit matching is being done wherein returns with mismatch of more than 10 percent or above a threshold are identified and pursued."

Khoya Paya

Khoya Paya is an initiative under Digital India to engage citizens to inform and exchange information on children who are missing and found. The platform is developed by the Ministry of Women and Child Development along with the Department of Electronics and Information technology where citizens can report missing and found children with the help of texts, photos, videos, and other means through smart phones. The Khoya Paya portal can be linked to the CCTNS project to help apprehend criminals as well as solve cases of missing minors. In March last year, the Central government had announced that it had given its approval for the implementation of the Automated Facial Recognition System (AFRS). This system, once implemented across the country, will be able to, among other things, extract an image from a video and match it with the image of an individual whose record is already in an existing database. Once the AFRS goes online it will be the world's largest facial recognition system. While speaking in Parliament, Union Minister of State for Home Affairs, G. Kishan Reddy had said that permission to implement the system, which will change the way policing is done in India, has been approved by the government.

Kisan Suvidha

The mobile application disseminates relevant information to farmers regarding weather, market prices, plant protection, inputs,

weather alerts, go-downs and storages and market-related information such as conducive markets, market rates, quantity demands, etc. The NITI Aayog document on National Strategy for Artificial Intelligence, envisions implementation of AI tools and big data analysis to bring more accurate information for supply and demand.

National Knowledge Network (NKN)

The NKN is a pan-India network with an aim to help in connecting India's universities, libraries, labs, research institutes across the country to improve inter-communication, stimulate research and create next-gen apps and services. In addition, NKN encourages connectivity of research and education networks between India and SAARC nations. It also facilitates collaboration between educational networks such as TEIN4, GARUDA, CERN and Internet2 to encourage exchange of scientific database and access to research facilities remotely.

Online Labs (OLABS)

OLABS is a virtual learning platform, created to help students conduct over 130 virtual lab practical to grasp concepts in Chemistry, Physics, Biology from class 9 to 12, and lessons in English and Maths for class 9 and 10. The experiments are a mix of interactive stimulations, animations and lab videos which can be accessed anywhere. This platform is especially aimed at helping students who live in geographically hard to reach areas and who don't have the infrastructure to support their on-hand learning. The content is wide-ranged, serving curriculums from CBSE and State Boards.

Project Monitoring Website for E-courts

E-court's project monitoring website has been created to aid courts with automated decision-making and decision-support system. It has been implemented across thousands of courts in metros, state capitals and district courts. While the main objective of the project was to streamline administrative activities in courts, the e-Courts project policy action plan document also envisions a larger vision for the judicial system of India. In phase III, utilisation of technologies such as migration of information to cloud has already started. In addition, the other technological innovations planned to be used are big data mining, and processing through block-chain technology and artificial intelligence.

Swachh Bharat App

Swachh Bharat Abhiyaan (SBA) is a sanitation and cleanliness centric campaign which engages citizens with cleanliness initiatives as well as subsidised toilet construction scheme for the impoverished population of rural and urban India. The National Informatics Centre (NIC) created a pilot project to oversee the authenticity of the implementation of toilet construction under the SBA. The app uses AI to ascertain the beneficiary through facial recognition software and digitally affirm the state of toilets, and cross-checks photos with the GPS coordinates shared by the smartphones.

Unified Mobile Application for New-age Governance (UMANG)

Developed by the Ministry of Electronics and Information Technology and National e-Governance Division (NeGD) to promote e-governance in India, it facilitates over 1200 central and state e-services. The app is multi-lingual and accessible through smart-phones, tablets and desktops through SMS, IVRs.

AADHAR

It is world's largest biometric-based identification system. Aadhar is one of the core pillars of the Digital India mission. The unique identities issued under Aadhar is at the heart of social and financial inclusion, public services delivery, aiding to create better policies and reforms and creating a more transparent and automated governance for the people. This is possible through seamless integration of various databases along with Artificial Intelligence and Machine Learning to aid facial recognition, voice-enabled chatbots and cloud-based systems. For example, the CCTNS, Khoya Paya app, PMJDY although fulfil different public services, they still use biometric identification to varying extend to fulfil these services.

Government e-Marketplace (GeM)

GeM is an e-marketplace initiative by the National Public Procurement Portal that enables government departments and public sector entities to procurement common use goods and services.

The users of this marketplace are state and central government ministries and departments, public sector undertakings, local bodies and autonomous institutions.

Crime and Criminal Tracking Network & Systems (CCTNS)

CCTNS is a project under National e-Governance Plan of the Government of India. It aims at creating a system that is comprehensively integrated to enhance the efficiency of policing through a creation of a nation-wide networking infrastructure for the evolution of IT-enabled highly efficient tracking system around the investigation and detection of crimes and criminals. Until July 2019 almost 15000 police stations have been included into the CCTNS and a total of 20.10 crore criminal/ crime records are available online along with corresponding databases on prisons, prosecution, forensics and courts in a holistic manner for administration. This is aimed at expediting exchange of information across police departments of all 35 States/UT and delivering better services to citizens. Several states have reported positive feedback in solving various types of complaints due to the cross-pollinated database.

Revolution in Digital Payment

DI has been instrumental in the growth of digital payments ecosystem and is set to transform the economy for good. India's unique payment systems such as BHIM-UPI and BHIM-Aadhaar are getting recognised globally. In 2020, India ranked 1st in digital payment transaction worldwide. The growth of mobile and smartphones have transformed the ecosystem of Digital Delivery of Services. The combination of Jandhan bank Accounts, mobile phones and digital identity through Aadhaar is helping the poor to receive the benefits directly into their bank account.

Digital payment transactions have grown multifold from 316 crore transactions in 2014-15 to 2071 crore transactions in 2017-18. In March 2021 427.21 crore transaction worth 175.81 lakh crore rupees were made. Till date 36.4 lakh transactions worth 158.25 crore rupees were made via UMANG App.

Today, BHIM app has become one of the main digital payment instrument for sending, collecting the money and paying for various utility bills. According to the PIB release of November 2018, more than 173 lakh transactions of value 7981 crore rupees were made using BHIM app. In the same year a total of 5.49 lakh crore rupees had been disbursed through Aadhaar based DBT to beneficiaries of 433 government schemes which had led to saving of over 90000 crore rupees by 2018 by removing fictitious claimants. Digital delivery of services is now easily available to common people through digital platforms like; National Scholarship Portal: in three Academic Years (2015-18), National Scholarship Portal received 3.57 crore applications and 5276 crore rupees have been disbursed to 1.8 crore students. Jeevan Pramaan has improved the ease of verification of pensioners using Aadhaar digital identity. Since its launch on 10 November 2014, over 239.24 lakh pensioners have submitted life certificates. By the end of 2018, 1.73 crore DLC had been processed. According to the latest data available, transaction volume of digital payments stood at 5475 crore rupees in the financial year 2019-2020.

In May this year, during the release of a report by NITI Aayog and Mastercard named "Connected Commerce: Creating a Roadmap for a Digitally Inclusive Bharat", CEO of NITI Aayog Amitabh Kant has said, "India is emerging as the hub of digital financial services globally, with solutions like UPI growing tremendously and being hailed as instrumental in bringing affordable digital payment solutions to the last mile." In the same programme Ari Sarker, Co-President, Asia Pacific, Mastercard said, "The COVID-19 pandemic has alerted us all to the fragility of cash and the resilience of digital technologies, including digital payments. Even with restrictions, commerce needed to continue to fulfil basic livelihood needs- and it was digital technologies that made it possible. Now more than ever, the power of brick-and-mortar distribution channels must parallel in the digital world. In the past years, India has changed its operating landscape in making digital more accessible and friction free. It is one of the most advanced digital payments environment in the world."

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Developing Sustainable Rural Enterprise

Partha Pratim Sahu

It is time to build the local economy through the tools of micro and small enterprise and making Indian villages and small town thrive with entrepreneurial possibilities. This will help people earn their livelihoods closer to their families and their communities. The micro, small and medium enterprise sector, which also includes SHGs, contributes significantly to the rural economy, both in terms of output and employment.

The COVID-19 pandemic, in addition to having significant health and education consequences worldwide, is also presenting itself as an unprecedented 'crisis of livelihood'. Creation of sustainable livelihoods and entrepreneurial avenues have emerged as major challenges. Although the pandemic began in metro cities and big towns, it has now penetrated into villages and hinterlands. The COVID-19 pandemic and the subsequent intense and prolonged lockdown have accentuated the livelihood crisis in rural areas, which was already reeling with agrarian distress. During this pandemic, we also saw millions of migrants walking back to villages. However, these adversaries have reiterated the role of family and the local economy. The rural households learnt to design and adopt a variety of coping strategies in response to pandemic. Local entrepreneurs, especially the women-led and household-based enterprises have emerged as a safety net for the family. In such testing times, sustainable entrepreneurship could be a key driver for a self-reliant India. It is time to build the local economy through the tools of micro and small enterprise and making Indian villages and small town thrive with entrepreneurial possibilities so that people can earn their livelihoods closer to their families and their communities.

The micro, small and medium enterprise sector, which also includes SHGs, contributes significantly to the rural economy, both in terms of output and employment. As per the latest statistics available, rural areas account for about 52 percent of enterprises and 45 percent of employment in the unincorporated non-agricultural enterprise sector during 2015-16. A preponderant majority of these enterprises, however, are one person/solo enterprises, which operate mostly through family labour. During this pandemic, the rural enterprise sector witnessed demand slump, liquidity crunch, labour shortage, inadequate access to formal financial institutions, rise in input cost and raw materials, unsold stock, delayed payment of dues, disrupted value chain and so on. The rural enterprise sector already operates at a disadvantageous position as compared to urban located large enterprises and the big corporate sector in terms of access to formal institutions, including finance, market, technology and innovations, education and skill levels of workers and owners, inadequate access to infrastructure, and so on. The COVID-led lockdown has made these constraints even more challenging for these enterprises.

In such a scenario, it is important to create a robust and process driven ecosystem, which will-: a) empower both existing and aspiring rural enterprises/entrepreneurs to access formal institutions b) prepare them to get benefitted from various programmes and schemes relating to enterprise promotion and c) put these enterprises on a scale ladder, so that these enterprises grow and

create employment opportunities over the years. The process driven support system, should address all relevant areas such as: 1) skill and knowledge gaps 2) finance 3) access to appropriate technology 4) infrastructure (i.e. transport, water, energy, logistic, human capital) 5) marketing, information, quality, branding, build value chains, linked with the market, both local and global 6) ease of doing business, regulatory and compliance issues 7) mentoring and hand holding. Following are the key pathways towards a sustainable rural enterprise development in the midst of pandemic.

Formalisation

There is a wide network of formal institutions operating at various levels to promote enterprise development. We have more than one ministry, Govt. department, specialised agencies implementing a large number of schemes and programmes relating to livelihood and enterprise development (See Box 1). But, a large majority rural located enterprises are not aware of these institutions and schemes. Even if, few of them are aware, they are not able to access. On the one hand, the rural entrepreneurs are not adequately skilled and educated to be aware of and have access to these formal institutions and on other hand, the regulatory procedures and formalities are still cumbersome. There is a need to sensitise these entrepreneurs about formal institutions and the whole range of programmes and schemes, which are meant for them. It is also equally important to simplify regulatory compliance formalities for rural start up. The recently announced PM Formalisation of Micro Food Processing Enterprises Scheme (PM FME Scheme) by the Ministry of Food Processing Industry aims at providing financial, technical and business support for upgradation of existing micro food processing enterprises. It provides support for capital investment for upgradation and formalisation with registration for GST, FSSAI hygiene standards and Udyog Aadhar. Under this scheme, skill training and hand holding support is also provided to prepare bankable business plan. Support towards capital investment, common infrastructure such as Common Facility Centres and branding and marketing are also provided to FPOs, SHGs and PCs to formalise and grow. It is important to enhance the access to information

Box 1: Key Institutions for Entrepreneurship Promotion

Central Government Institutions	National Training Institutes and Banks and Financial Institutions
• National Board for Micro, Small and Medium Enterprises (NBMSME) • Micro, Small and Medium Enterprise Development Organisation (MSMEDO) formerly Small Industries Development Organisation (SIDO) – MSME • Development Commission – MSME • Khadi and Village Industries Commission (KVIC) - MSME • MSME – DIs • National Small Industries Corporation (NSIC) – MSME • Coir Board - MSME • Credit Guarantee Fund Trust for Micro and Small Industries Managed by SIDBI • Biotechnology Industry Research Assistance Council (BIRAC)	National Training Institutes • National Institute for Entrepreneurship and Small Business Development (NIESBUD) • Indian Institute of Entrepreneurship (IIE) at Guwahati • National Institute for Micro, Small and Medium Enterprises (NI-MSME) • National Institute of Rural Development and Panchayati Raj (NIRDPR) • National Skill Training Institutes for Women (NSTIs for Women) Banks and Financial Institutions Bank and Financial Institutions • National Bank for Agriculture and Rural Development (NABARD) • Small Industries Development Bank of India (SIDBI) • National Scheduled Castes Finance and Development Corporation (NSCFDC) • National Backward Classes Finance and Development Corporation (NBCFDC) • National Handicapped Finance and Development Corporation (NHFDC)

and support for these enterprises and provide all support measures on a single platform. More such efforts are called for other industry groups as well.

Platformisation

During the pandemic times, implementation of programmes and schemes were affected. Towards creating an enabling ecosystem, interactive IT enabled platforms were initiated by various ministries and departments to provide easy access of financial and non-financial service needs of the entrepreneurs. On a single platform, a bouquet of services including registration, regulatory compliances, connect with banks, connect with govt. schemes, mentoring and handholding, peer network, investor connect, marketing and business advisory, branding, quality and market research etc. were ensured. To reach out to all intended beneficiaries and provide much needed support, a series of online IT-enabled portals or platforms were created (See Box 2).

In addition to these platform, several initiatives have been undertaken during the pandemic times to improve the digital empowerment of small and micro enterprises. Digital Unlocked - an initiative by Google in association with FICCI and Indian School of Business, aims to help Indian businesses unlock exponential growth with digital. The key objectives of this initiative are to: 1. build capacity and equip the Startups, SMEs and Innovators with the necessary skills for utilising the power of Internet; 2. create their online presence, launching and executing cost-effective targeted digital marketing campaigns; 3. reach out to a wider audience, increasing the sales volumes, keeping a consistent

Box 2: IT Enabled Portal or Platform

Name of the portal	Ministry/ Department	Key services offered
Creation and Harmonious Application of Modern Processes for Increasing the Output and National Strength (CHAMPIONS)	Ministry of MSMEs	- To help the MSMEs in this difficult situation in terms of finance, raw materials, labour, permissions, etc. - To help the MSMEs capture new opportunities including manufacturing of medical items and accessories. - To identify the sparks, i.e., the bright MSMEs who can withstand at present and become national and international champions.
MSME 'Sampark'	Ministry of MSMEs	- Provide a digital platform to connect job seekers with those enterprises seeking trained human resources
MSME 'Sambandh'	Ministry of MSMEs	- Public procurement policy monitoring portal
MSME 'Samadhaan'	Ministry of MSMEs	- To deal with payments & dues
MSME Idea Portal	Ministry of MSMEs	- Bank of schemes, ideas, innovations and research
Udyamimitra	Small Industries Development Bank of India (SIDBI)	- To provide easy access of financial and non-financial service needs; - To provide 'End to End' solutions not only for credit delivery but also for the host of Credit-plus services by way of hand holding support, application tracking, multiple interface with stakeholders (i.e. lenders, service providers, applicants)
Women Entrepreneurship Platform	NITI Aayog	- Providing services in 6 main focus areas: Community and Networking; Funding and Financial Assistance; Incubation and Acceleration; Compliance and Tax Assistance; Entrepreneur Skilling and Mentorship and Marketing Assistance;
National Scheduled Caste and Scheduled Tribe Hub Scheme	Ministry of MSMEs	- Registration; Mobilisation and capacity building of Tribal SHGs; Business Plan and Financial Modelling for PCs; Financing Tribal SHG driven enterprises; Market development, supply chain linkages; Procurement, processing technologies and infrastructure

connect with the potential customers, staying competitive in the market place, etc. Similarly, Digital Saksham initiative by CII-Mastercard-NIMSME aims to educate and train micro and small business owners and entrepreneurs enabling them to integrate into the digital economy and access credit, expand their market access, diversify their customer base, digitise their financial operations and solidify their supply chain.

While these initiatives are welcome moves during this pandemic times, but it may be worth noting that more than 90 percent of rural located enterprises do not have access to computer or internet. A preponderant majority of rural entrepreneurs also do not have the required skill to get benefited from these digital services, which are meant for them. Therefore, in addition to, sensitising the rural entrepreneurs about these portals and platforms, adequate funding along with training and capacity development of rural entrepreneurs to navigate smoothly to a digital ecosystem is required. During the COVID-19 there is urgent need for subsidised digital connections, mobile handsets and other electronic gadgets for the rural micro and small entrepreneurs, especially women and underprivileged entrepreneurs from SCs and STs communities. Such digital services may also be provided in Common Service Centres or Me Seva Centres or in Panchayat offices. Panchayats should collaborate with other stakeholders such as officials of State Rural Livelihood Missions (SRLMs), MSME-Development Institutes, District Industries Centres (DICs), MSE Facilitation Councils (MSEFCs) operating in rural landscape to leverage on these digitisation efforts.

Mentoring and Handholding

Regular and continuous mentoring and handholding is an important ingredient of an entrepreneurial ecosystem. The need for these services are even more crucial in the wake of COVID-19 pandemic. The micro and small entrepreneurs need mentoring and handholding not only on business and technical skill but also to deal with various psycho social problems. Mentoring and hand holding services may include digitisation and formalisation, availing of government loans, subsidies or other benefits, ensuring compliance with local, regional, and national regulation, aiding partnership with digital marketing platforms and digital payment platforms, etc. There are large number of agencies such as RSETI, EDI and MSME Tool Rooms (known as MSME Technology Centres), ITIs, DICs, banks and industry associations and chambers to provide hand holding with respect to entrepreneurship development, credit counselling, formulation of business plan, financial literacy, vocational training etc. But most of the rural located enterprises are neither aware of these services nor being able to get benefits from these institutions. The rural entrepreneurs need to be adequately sensitized about these agencies and their services. Recently, a mentorship-led entrepreneurship development programme has been initiated by Ministry of Tribal Affairs (MoTA) in partnership with Facebook (See Box 3).

An expert committee set up by the Reserve Bank of India (RBI) has recommended focused attention to the financial and operational needs through handholding by both banks and the government. The committee recommended to increase the number of MSE Facilitation Council (MSEFC) particularly in larger states. It also recommended to set up Enterprise Development Centres (EDCs) within District Industries Centres (DICs) and further enable be these to be run professionally and facilitate development of entrepreneurs into full-fledged, self-sustaining enterprises.

Box 3: Going Online as Leaders (GOAL)

- This programme aims to provide mentorship to tribal youth through digital mode;
- It support tribal youth and women to help them acquire skills and knowledge through mentorship in various sectors including horticulture, food processing, bee keeping, tribal art and culture, medicinal herbs etc.
- It operates through a meeting portal for mentor and mentee;
- All selected beneficiary will get smartphones and Internet access (for one year) by Facebook and get connected with a designated mentor to get training on Digital Literacy, Life Skills and Leadership and Entrepreneurship;
- The programme will also create awareness amongst tribal beneficiaries about various schemes initiated by Central and State Governments for welfare of STs as well as their fundamental duties.

Community Resource Persons (CRPs) led Enterprise Promotion

The creation of a cadre of mentors for entrepreneurship promotion is a well accepted methodology and has been included under various livelihood programmes including Start-up Village Entrepreneurship Programme (SVEP) project under DAY-NRLM which is focussing on the development of Community Resource Persons (CRPs) for Entrepreneurship Promotion (CRP-EP) as local level mentors for supporting rural women to start their small businesses. There are large number of successful CRP driven livelihood and entrepreneurship programmes initiated by Professional Assistance for Development Action (PRADAN), Kudumbashree and SEWA. Odisha Tribal Empowerment and Livelihoods Programme (OTELP) also implemented Community Resource Persons Model to provide land to landless households in 36 villages in three districts of Odisha. The CRPs are chosen from within the community and trained in life-skills and leadership, business development, risk management, market analysis, communication, marketing, financial linkages, etc. The trained CRPs will further identify women, from their own village as well as those nearby, who already have an existing business or are aspiring to start a new business. These CRPs besides imparting training, play a facilitation role in creating backward (say, with financial institutions) and forward (with markets and clientele) linkages for these small businesses in the value chain. They also mentor and provide psychosocial support to the women entrepreneurs to build self-confidence, capacity for decision making, and staying power in handling social pressures and family crises, while managing and growing the business. See Box 4 for couple of good cases of CRP-led initiatives.

We have a large cadre of CRPs such as Kisan Sakhi/Krishi Sakhi, Pasu Sakhi (Livestock CRP), NTFP CRP, MatsyaSakhi (Fisheries CRP), Udyog Sakhi (Value Chain CRP), CRP-Enterprise Promotion (CRP-EP), Bank mitras, e-CRPs, Tablet Didi, Patrakardidi and so on, implementing rural development schemes and programmes. These CRPs can be trained to provide a large bouquet of services made available to the rural entrepreneurs at their doorstep. The CRPs can serve as a link between community and various department /agencies. They are seen as a catalyst who help restore the community's confidence on Government system by bringing Govt. departments closer to the people. Skilled youth and women returnee-migrants may be encouraged to work as CRPs. CRPs model need to be scaled up by grooming them and empowering them to successfully implement various entrepreneurship development programmes in rural areas. The success of the CRP-led mentorship model lies on the methodology and curriculum adopted for imparting training to these CRPs. There is a need to improve the training and capacity development of these CRPs with a regular interval to appraise them about changes in the policies and programmes and also impart them new skills to facilitate them to implement both on-farm and non-farm livelihood programmes more effectively.

Panchayat as a Hyper Local Platform

During the pandemic times, the local institutions have played a very crucial role. Local institutions such as panchayats not only operated quarantine centres, but also delivered food and medicines, besides maintaining law and order. At this difficult times, it is essential to assess the magnitude of constraints and challenges faced by rural entrepreneurs and mainstream these in the overall rural development strategy. The Gram Panchayat Development Plan (GPDP) can play a

Box 4: Stree Nidhi and Haqdarshak

Initiative	Key focus areas
1. Stree Nidhi, women's credit cooperative federation	- It engages SHG members as agents who reportedly earn an average of Rs.15,000 per month; - Offers a full range of services, including the distribution of government social security schemes and SHG related transactions. These agents are able to deliver financial services at the doorstep of members.
2. Haqdarshak	- Imparting training to village level women/entrepreneurs called Haqdarshaks to use the App (on a smart phone) to reach out and help BPL families to get various Govt. schemes.

direct role in identifying sectors, sub-sectors and activities by their respective business potential and devise a mechanism to prioritise resource allocation and helping those entrepreneurs and rural artisans who suffered varying degree of losses during the pandemic times. Special Gram Sabhas may be conducted to flag up and discuss issues of local entrepreneurs and artisans. The panchayat secretariat can play a role of 'hyper local platform'or a 'point of contact' by connecting these entrepreneurs with various Govt. schemes and programmes and also help them to get access to support measures available on IT enabled portals or websites. Thus, Gram Panchayat Development Plan (GPDP) could be truly an effective tool to mainstream entrepreneurship and livelihood challenges in the rural development strategies and overall economic policies. Thus, the Panchayati raj institutions, being the last mile institutions can play a significant role in rural enterprise development, with support from various stakeholders and create an ecosystem for sustainable enterprise development. Panchayats should also make due efforts to sensitise rural people about new programmes and schemes announced during the pandemic times, such as the central Govt's MSME Package, PM Swanidhi for street vendors, PM Garib Kalyan Yojna and help them getting benefit from it, for which they are eligible.

In addition to above discussed pathways, since with the prolonged lockdown, disruption in the supply chain and demand slump, the rural enterprise sector have been facing severe marketing constraints; access to shared services such as Common Facility Centres, Cluster Development Programmes, Farmer Producers Organisation (FPO), Producers Companies are going to make perceptible impacts on micro and small enterprises and SHGs operating in rural areas.

Entrepreneurship development can ensure sustainable livelihoods and create employment opportunities for local people in the midst of pandemic. Understanding the exact needs and problems faced by the rural entrepreneurs and how they cope with these issues is the key to successful design and implementation of a scheme. What is required is a holistic approach for developing entrepreneurial abilities, managing and nurturing their capabilities and providing long-term handholding to both aspiring and existing rural entrepreneurs. Seeding and supporting more rural entrepreneurs will give credence to the slogan 'vocal for local'. Let us work together to energise the local economy and built a self-reliant India.

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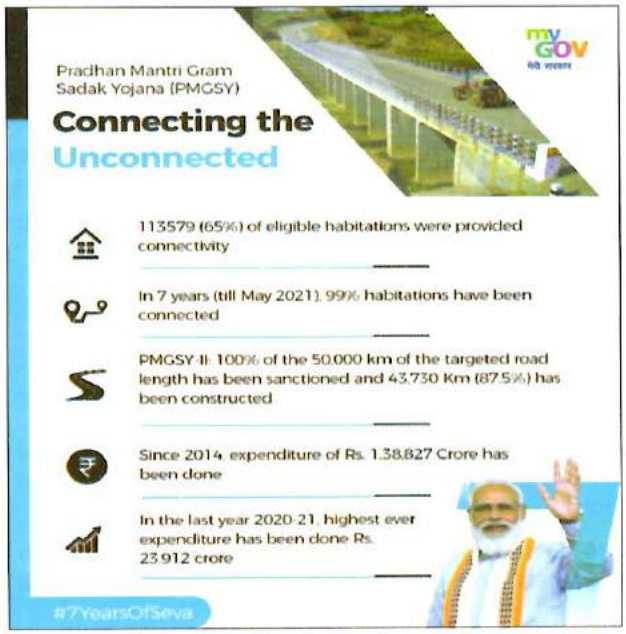
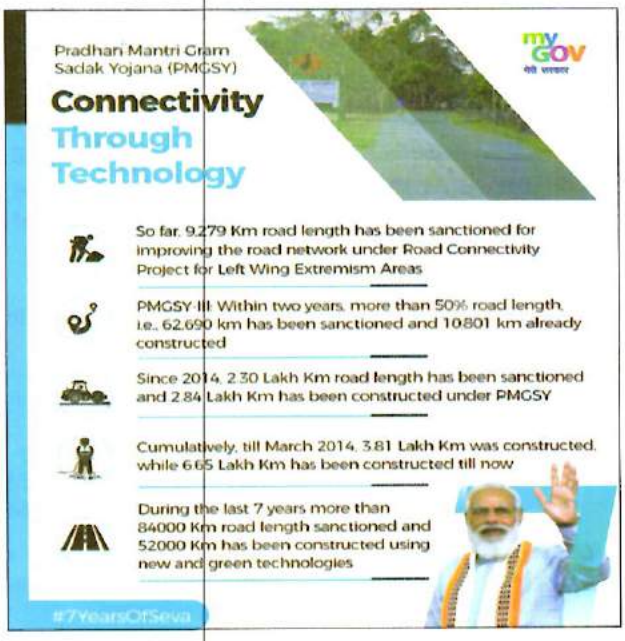




Augmenting Rural Healthcare Infrastructure

Sameera Saurabh

Accessibility, affordability and accountability of the healthcare system of India are essential for better health and well-being of its people. The impressive growth of telemedicine in India during the pandemic is evident, as 'e-Sanjeevani OPD' (a patient-to-doctor tele-consultation system) has recorded almost a million consultations since its launch in April 2020. The current global pandemic of COVID-19 necessitates a public health strategy with more emphasis on epidemiology, especially with regards to understanding the causes as well as identifying appropriate population-based behavioral and educational programmes.

India has made significant advances in creating access to quality, free and universal healthcare-for individuals and populations-over the decade, reducing the gap between rural and urban areas and between the rich and the poor. However, with more than 70 percent population of its population residing in rural areas, rural health care remains one of the challenges being faced by the country. That is why availability and accessibility of healthcare facilities, and building and sustaining health infrastructure is a big priority for policy planners especially in the backdrop of the COVID-19 pandemic. Accessibility, affordability and accountability of the healthcare system of India are essential for better health and well-being of its people. The impressive growth of telemedicine in India during the pandemic is evident as the 'e-Sanjeevani OPD' (a patient-to-doctor tele-consultation system) has recorded almost a million consultations since its launch in April 2020. As telemedicine consultations correlates strongly with the internet penetration in a state, more internet access will increase usage of telemedicine and reduce geographic disparities in healthcare utilisation.

The current global pandemic of COVID-19 necessitates a public health strategy with more emphasis on epidemiology, especially with regards to understanding the causes as well as identifying appropriate population-based behavioral and educational programmes. It is important to realise that the pandemic had initially started in well-developed countries. However, the virus does not differentiate between rich-poor or rural-urban dichotomies. It is particularly a threat to a country like India, where 68–70 percent of the

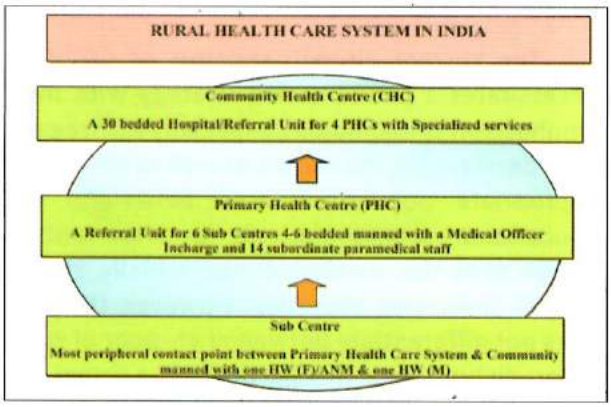
population lives in rural areas that also has the highest overall burden of disease globally.

Rural healthcare system in India[1]

The health care infrastructure in rural areas has been developed as a three tier system and is based on the following population norms:

Centre	Population Norms*	
	Plain Area	Hilly/Tribal/ Difficult Area
Sub Centre	5000	3000
Primary Health Centre	30000	20000
Community Health Centre	120000	80000

**Number of persons covered under the services of a particular Facility (SC, PHC & CHC)*



The healthcare market is expected to increase about three-fold by 2022. However, the rural healthcare sector still faces challenges and needs focused policy-level interventions. There is a need for having quality healthcare services at the state-run hospitals. The overall health care utilisation is also low, since only half of (52 percent) of Indian mothers receive three or more ante natal checkups and only 43.5 percent of children in India receive all vaccinations. At one side our peripheral health centres are under-utilised whereas on other side our tertiary and secondary (District) level facilities are often argued as overloaded with the work that could have been done at lower centres, resulting in compromise of quality.

The health care services and systems in India continue to develop and there is a scope for improvement required in terms of workforce shortages, infrastructure and quality of care. With the National Health Mission and Government's commitment, there is scope for improvement regarding proving adequate and affordable healthcare.

There is a need for better coordination between the line departments to tackle public health emergencies such as COVID-19. The health care system has to be prepared and must be stepped up to contain COVID-19 transmission in the rural areas, public health challenges, including elimination of persisting communicable diseases like Tuberculosis, and ensuring equitable health care. The emergence of new pandemic, in the initial stages, did highlight a special infrastructural gap considering the slow pace of testing services and surveillance system. But the pandemic time has also emerged as an opportunity with India creating the needed infrastructural support on war-footing.

India's public health expenditure has increased from 0.9 percent of GDP in 2015-16 to 1.1 percent of GDP in 2020-21. The Economic Survey 2020-21 observed that India ranks 179th among 189 countries in prioritising healthcare in the government budget. Notably, the National Health Policy, 2017 aims to increase public health expenditure to 2.5 percent of the GDP by 2025. In India, 75 percent of the healthcare infrastructure is concentrated in urban areas where only 27 percent of the total Indian population is living. Private healthcare has been witnessing steady growth whereas there is a serious need to have good quality or infrastructure in the public healthcare sector. When it comes to COVID-19 vaccination drive, it is pertinent to note that vaccine hesitancy remains one of the biggest challenges to overcome in rural areas. Technology challenge is another factor which may have stunted the pace of vaccination process in these areas. Thus, health infrastructure and enhancing service delivery by training human resources in healthcare are crucial for achieving objectives of an AatmaNirbhar Bharat. Healthcare infrastructure in India can be categorised into physical infrastructure and human resources who provide medical services.

Physical Infrastructure

Depending on the level of care required, healthcare in India, is broadly classified into three types. This classification includes primary care

(provided at primary health centres), secondary care (provided at district hospitals), and tertiary care institutions (provided at specialised hospitals like AIIMS). Primary health care infrastructure provides the first level of contact between health professionals and the population. Broadly, based on the population served and the type of services provided, primary health infrastructure in rural areas consists of a three-tier system. This includes Sub-Centres (SCs), Primary Health Centres (PHCs), and Community Health Centres (CHCs).

The High-Level Group on Health Sector (2019) and the report of 15th Finance Commission on Ayushman Bharat have observed that focus on prevention and early management of health problems can reduce the need for complicated specialist care provided at the tertiary level. It recommended that the focus of healthcare provision in the country should be towards providing primary healthcare. The finance minister announced that PM AatmaNirbhar Swasth Bharat Yojana will be launched with an outlay of Rs. 64,180 crore over six years. The scheme will be focused at: (i) developing primary, secondary, and tertiary healthcare systems, (ii) strengthening existing national institutions, and (iii) creating new institutions for detection and cure of new diseases.

The government plans to transform 1.5 lakh sub healthcare centres, primary health centres and urban primary health centres into Health Wellness Centres (HWCs) by 2022. HWCs will provide various range of services beyond maternal and child healthcare services. These services will include: (i) care for non-communicable diseases, (ii) rehabilitative care, (iii) mental health services, (iv) first level care for emergencies and trauma, and (v) free essential drugs and diagnostic services.

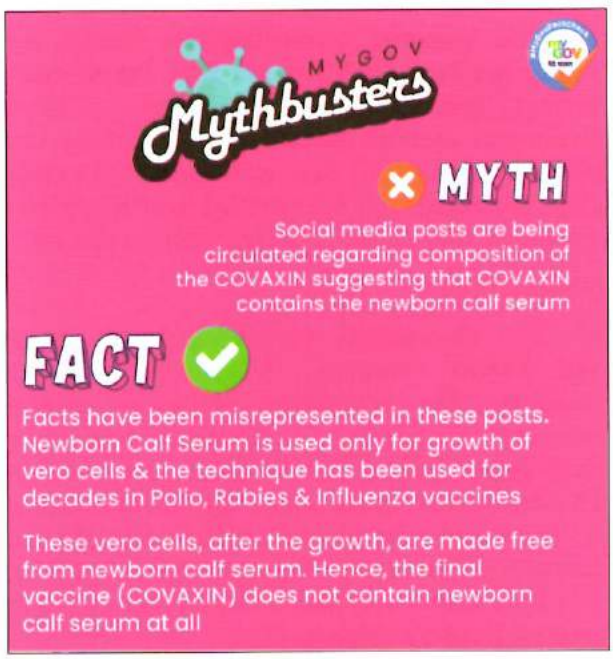
Further, the high-level group noted that India has 1 bed per 1,000 people, which is significantly less than the global average of 2.9 beds. The National Health Policy, 2017 plans to increase this to 2 beds per 1,000 people. This could be achieved by creating 3,000 to 5,000 hospitals with 200 beds each by 2025.

Human Resources in Health

The Economic Survey 2020-21 observed that the aggregate density of health workers is 23 per 10,000 population, which is significantly lower than that recommended by World Health Organisation (WHO) (44.5 health workers per 10,000 population) to achieve the Sustainable Development Goals (SDG) targets by 2030. As of 2019, there is 1 doctor per 1,511 people and 1 nurse per 670 people, which is lower than the WHO standard of 1 doctor per 1,000 people and 1 nurse per 300 people. Despite the increase in total number of health workers, there is shortfall of doctors, specialists, and surgeons. For example, the number of health workers (female) (including auxiliary nurse midwives) has increased from 1,33,194 in 2005 to 2,19,326 in 2018. As of 2018, 11 percent positions of doctors are vacant in primary health centres, and only 60 percent of total required specialists have been approved for appointment in primary health centres. The major areas where enhanced deployment of human resources is required are surveillance activities at grass root level, supervisory management of containment operations, laboratory testing, collection, collation and dissemination of data, risk communication and clinical management.

Pradhan Mantri Jan Arogya Yojana (PMJAY)

The Ayushman Bharat programme - PMJAY was launched in September 2018-19. It aims to provide an insurance cover of Rs Five lakh per family per year to 10.7 crore poor families. The scheme subsumed two centrally sponsored



schemes, namely, Rashtriya Swasthya Bima Yojana (RSBY) and the Senior Citizen Health Insurance Scheme.

Benefits

The scheme provides insurance coverage for secondary and tertiary healthcare. The scheme provides 1,350 medical packages such as surgery, cost of medicines, day care treatments, and diagnostics. In addition, the scheme provides for pre- and post-hospitalisation expenses.

Allocation

In 2021-22, PMJAY has been allocated Rs 6,400 crore, which is double the actual spend two years ago (Rs 3,200 crore in 2019-20).

The Standing Committee on Health (2018) and a study report of the 15th Finance Commission (2019) had noted that PMJAY is just an extension of RSBY which provided for coverage of up to Rs 30,000 per family per annum. Hence, to ensure proper implementation of the scheme, an analysis of the failures and inadequacies of RSBY should be done. This would look at whether: (i) RSBY covered all potential beneficiaries, (ii) hospitalisation rates increased under the scheme, and (iii) insurance companies were profitable under the scheme. The key challenges identified in the implementation of RSBY include: (i) low rate of enrolment of beneficiaries, (ii) increase in out-of-pocket expenditure, and (iii) issues in empanelment of healthcare service providers.

The Standing Committee on Health and Family Welfare (2020) noted that PMJAY faces various implementation challenges. These challenges include issues in: (i) identification of beneficiaries, (ii) non-inclusion of numerous eligible people, (iii) empanelment of healthcare providers, and (iv) hospital transaction system

Implementation

The Economic Survey 2020-21 notes that PMJAY enhanced the health insurance coverage. The proportion of health insured households increased by 54 percent in states that implemented PMJAY and decreased by 10 percent for states which did not implement it. The infant mortality rate also decreased by 20 percent in states with implementation whereas in states without implementation the mortality rate declined by 12 percent.

Table-1 shows details regarding the implementation of the Ayushman Bharat programme which includes PMJAY and Health and Wellness Centres.

Table-1: Status of implementation of Ayushman Bharat - PMJAY (as of September 2020)[2]

Indicators	All India
Beneficiary families covered (in crore)	13.13
Funds disbursed to States/UTs for implementation (in crore)	5,474
Total hospital admissions authorised (in crore)	over 1.24#
Health and Wellness Centres	59,307*

Note: #Includes 5.13 lakh hospital admissions for testing and treatment of COVID-19;

**As on February 10, 2021.*

Out-of-Pocket Expenditure

Out-of-pocket expenditure is the payment made directly by individuals at the point of service where the entire cost of the health service is not covered under any financial protection scheme. While PMJAY provides coverage for secondary and tertiary levels of healthcare, most of the out-of-pocket expenditure made by the consumers is on pharmacies (47 percent), private general hospitals (31 percent), government general hospitals (8 percent), medical and diagnostics (7 percent), and towards patient transport and emergency rescue (7 percent).

The Economic Survey 2020-21 observes that the overall out-of-pocket expenses in India on healthcare are 60percent of the total expense on public health (which is one of the highest in the world). The survey highlights that increasing the spending on public health from 1 percent of the GDP to 2.5-3 percent of GDP will help in reducing the out-of-pocket expenses from 60 percent to 30 percent.

Pradhan Mantri Swasthya Suraksha Yojana

Pradhan Mantri Swasthya Suraksha Yojana (PMSSY) was introduced in 2003 with objective of: (i) correcting regional imbalances in the availability of affordable and reliable tertiary healthcare services, and (ii) augmenting facilities for quality medical education in the country. This includes establishing AIIMS like institutions and upgrading

certain state government hospitals. Over the years, the scheme has been expanded to cover 20 new AIIMS and 71 state government hospitals. The future of healthcare lies in our ability to provide access to quality healthcare to all. India's healthcare policy must continue to focus on long-term healthcare priorities despite the setback from the pandemic. Both demand and supply side constraints in the healthcare sector need to be addressed.

- Effective handling of communicable disease by building adequately trained health emergency response teams and setting up dedicated control rooms at district level.
- Controlling rising non-communicable diseases prevalent in India, partially through awareness campaigns on healthy lifestyle.
- Strengthening the primary healthcare facilities with adequate human resource and equipment.
- Providing universal health coverage and extensive promotion and utilisation of Ayushman Bharat's PMJAY and health and wellness centres.
- A standardised system for quality reporting on healthcare for hospitals, physicians and insurance companies is a must to benchmark such services.
- Last but not the least, to root out 'quacks' from the system and tackle information asymmetry in the healthcare sector. Regulation and supervision of the healthcare sector needs to brought in with more vigour, such as an independent sectoral regulator.

Finally, provision of healthcare for rural areas hinge on the affordability of treatment and diagnostic costs. In order to propel the indigenous production of medical devices, drugs, surgicals and diagnostics, the biomedical scientists in the hospitals, research institutions can come together and translate their knowledge into affordable medical products. This will be important in fulfilling the PM's concept of 'Make in India' thereby saving both the costs of import thereby enabling affordable care in rural areas.

Conclusion

The impact of the pandemic, especially the lockdown strategy in the social sphere is multi-dimensional. India's healthcare system has been improving with well meaning policy reforms, however, there is substantial potential by making use of technological adavnces in order to improve health outcomes. Increasing access and utilisation; bringing down high out-of-pocket health expenditure; dealing with inequity in availability of healthcare; increasing budget allocation for healthcare and human resource for health; will benefit in the long term. Both the supply and demand side factors of healthcare needs urgent attention. The supply side of the health sector in terms of physical infrastructure and human resource needs to be scaled up significantly.

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Developing Rural India

Devika Chawla

With agriculture and allied activities forming the major contributor to rural economics; boosting farm incomes, promoting better soil health and diversifying the agricultural palette of the rural areas, all become pertinent to not just higher rural economic growth. It also fulfill India's numerous health, environment and food security commitments globally. Apart from ensuring a minimum standard of life for rural people through welfare schemes and a wider social security net, strengthening the economic fundamentals of rural India is the other half; critical to guaranteeing sustainable and dignified livelihoods for all. To this end, the government has made tremendous strides in making India's rural and village economies more lucrative, diverse and better aligned to fulfilling India's larger economic goals.

That the rural hinterland of the country is also the backbone of our economy is conventional wisdom these days. What is, however, much less known, is the immense potential and promise rural progress holds in powering the world's fifth largest economy to its zenith in the years to come. This is what this article asserts- by tracing the past seven years of Prime Minister Narendra Modi's approach towards sustainable and inclusive rural development.

Since assuming office in 2014, Prime Minister Modi has accorded high priority to India's rural economy and followed a multi-pronged approach to enhancing its role as an agro-dependent geography to one centered around sustainability, inclusivity and prosperity for all. The essential elements of this approach involved providing continued access of basic amenities such as toilets, drinking water and natural gas, to the rural populace thereby, ensuring a minimum living quality of life to the most vulnerable sections of society.

This was amply visible from Prime Minister's launch of the 'Swachh Bharat Mission' in 2014, one of the first nationwide rural-centric schemes by the, government. Seven years down the line, the remarkable results are there for all of us to witness from 38 percent of toilet coverage pan-India in 2014, the country now has a hundred per cent coverage of toilets, with nearly 11 crore (110 Million) toilets being constructed-largely across rural India. As a result of this, over 6,00,000 villages have been declared Open-Defecation Free (ODF), leading to better health and sanitation for a large chunk of Indians.[1] Similarly, the launch of "Ujjwala Yojana" five years ago was primarily targeted at providing energy security and a dignified life with better health for rural women by providing them over eight crore (80 million) free gas cylinders since 2016.[2]

Crucial amongst the other essentialities of life is having one's own home. India's rural areas have long been associated with widespread homelessness and kuccha (thatched), poorly built houses, which further aggravate poverty in villages. Realising the significance of affordable and reliable housing for all in ensuring equitable development in rural India, the government launched in 2016, the Pradhan Mantri Awas Yojana-Gramin (PMAY-G) to provide all-weather homes to the poorest strata of society. Till date, over 1.5 crore houses have been built in rural areas, reducing homelessness and acute poverty for a majorly rural populace.[3]

Complementary to efforts for uplifting rural India was the implementation of the world's largest health assurance scheme by the Indian government, named "Ayushman Bharat Yojana," which currently has treated nearly two crore beneficiaries[4], mostly coming from lower-income backgrounds and excluded from the healthcare system owing to their financial constraints.

Apart from ensuring a minimum standard of life for rural people through welfare schemes and a wider social security net, strengthening the economic fundamentals of rural India is the other half; which is critical to guaranteeing sustainable and dignified livelihoods for all. To this end, the government has made tremendous strides in

making India's rural and village economies more lucrative, diverse and better aligned to fulfilling India's larger economic goals.

Prominent among these are the massive electrification programs which led to each village of India getting electrified in 2015 complemented by the "Ujala Yojana" under which over 36 crore (360 million) LED bulbs[5] have been distributed in a bid to take India's villages out of the bane of darkness that hampered their progress for so long. Another milestone effort to boost economic activity and higher mobility has been the astonishing pace of rural roads being constructed in the past seven years- over 2.25 lakh kilometers of them connecting 97 per cent of India's villages with the rest of the country.[6]

With agriculture and allied activities forming the major contributor to rural economics, boosting farm incomes, promoting better soil health and diversifying the agricultural palette of the rural areas, all become pertinent to not just higher rural economic growth but also to fulfill India's numerous health, environment and food security commitments globally. These are the precise domains where the launch and implementation of initiatives such as Jan Dhan-Aadhaar-Mobile (JAM Trinity), Direct Benefit Transfer (DBT), Soil Health Cards (SHCs), e-National Agricultural Market (e-NAM), PM-Kisan Samman Nidhi Yojana (PM-KISAN), PM Fasal Bima Yojana and PM Krishi Sinchayee Yojana, have all led to a near-transformation of agricultural activity in rural areas by making it farmer-centric rather than crop-centric.

In doing so, the role of digital media cannot and must not be understated. The wonderous compatibility of JAM trinity and DBT together is responsible for plugging monetary leakages in public funds amounting to billions of dollars each year, leading to better outcomes for all and greater allocation of public resources. Moreover, the introduction of optical fibre connectivity through the BharatNet program which has seen almost 1.6 lakh Gram Panchayats (Rural Councils) of the country getting digitally connected, has been instrumental in driving consumption and demand from rural geographies in recent years.

This has been complemented by record low rates of mobile data and calls in India leading to even higher participation of rural areas in the broader economic and social activity. On the back of an ever-growing network of Common Service Centres (CSCs), governmental service delivery nodal points, rural efficiency and engagements have grown rapidly.

While for the longest time, we have equated our villages with agriculture, the recent decades have witnessed a sustained push towards diversifying rural economy away from its over-dependence on agriculture, towards more value-sensitive and employment generating activities such as industries, off-farm activities, entrepreneurship, micro financing and handloom/heritage-based local industries. The government has converged much of its policy targets to aggressively promote grass roots entrepreneurship and innovation through schemes like Mudra Yojana, Van Dhan Yojana, One District One Product (ODOP), Skill India, Kaushal Vikas Yojana and Standup India. With higher productivity, young demography, and a skilled workforce, the growth potential of rural economic activity is immense and waiting to be tapped.

All the above-mentioned initiatives points to a serious commitment and outcome-oriented approach on the union government's part towards long-term growth of rural India in the 'New India' growth story. For far too long has rural India remained a mere spectator, much less a beneficiary, of the economic transformation seen across our urban centres.

The government has time and again, shown that no meaningful economic or social progress can take place in India without its villages and thus, it is high time, rural India becomes an active participant, even the driver, of India's rise in the years to come. Rural India, for its part, couldn't agree more.

Footnote

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