

## POLICY CHALLENGES AND OPPORTUNITIES IN POST-COVID INDIA

DEBASHIS BANDYOPADHYAY\*

---

*The ongoing crisis of COVID is an unprecedented episode in independent India. It has therefore necessitated extraordinary measures. Not only have these measures left the country totally unprepared to come in terms with the consequences, they have also posed unique challenges before the policy makers who are tasked with rebuilding the country once the crisis subsides. Expectedly, almost no sector has been left unscathed; each presenting their own set of challenges (and interestingly also opportunities) during the period of recovery. This paper does not make any empirical or critical analysis; it is a generalized discussion of the challenges and opportunities covering a few chosen areas that have been exposed by the pandemic. The main objective is to flag some thoughts on what we could learn from the COVID and what policy options could insulate the country from similar threats in future.*

---

### Introduction

The Spanish flu that gripped the world during the First World War, is known to be the largest influenza pandemic in history. It began in the Northern Hemisphere (in Europe) and spread to almost all parts of the world. Even in the much less connected and less populous world during those times, the pandemic stretched from the wild valleys of Alaska to the Samoa Islands of the Pacific, killing an estimated 50 – 100 million people. In India, the estimated casualty was around 18 million people, with a mortality rate of around 6%. Ever since this outbreak, the current SARS-CoV2 pandemic seems to be the most wrecking; although it is not entirely justified to compare the two contagions.

Biologically, the SARS-CoV2 (popularly called COVID-19) has a zoonotic origin showing genetic similarity with bat coronaviruses suggesting a bat-borne emergence

followed by eventual transmission to humans. Epidemiology indicates that a single infection under uncontrolled environment with no immune barrier can infect 1.4 to 3.9 new individuals. It is no surprise therefore that the virus since its emergence has infected around 85,83,928 individuals worldwide (as on June 19, 2020), covering more than 200 countries, causing almost 4,56,432 deaths till aforesaid date<sup>1</sup>. Public health facilities have been overburdened even in some of the most advanced countries; global movement have come to a grinding halt; and the measures adopted by governments to contain the spread has inflicted severe damage to the economy. It is estimated that world unemployment has risen to 32 million as a sequel of this infection.

As governments and policy makers scramble to find the most appropriate strategy to contain the spread of the virus, it is also important to visualize the possible scenario during the recovery period or the post-Covid times. Needless to mention, considering the fact that the world is vastly interconnected now; the nature of manufacturing and other economic activities vastly different from Spanish flu days; and human needs and wants significantly magnified, responses are bound to be different. More

---

\* Senior Principal Scientist with the Council of Scientific & Industrial Research at the CSIR-Central Glass & Ceramic Research Institute, Kolkata and works in the areas of intellectual property rights, science policy and science dissemination. Views expressed here are his own. e-mail : debashis.kolkata@gmail.com

importantly, the diversity of the economy is much larger with sectors such as services, hospitality, tourism etc being key drivers.

The scenario is unprecedented in independent India. Never has the country witnessed a health emergency of this magnitude. Neither has it ever been tested for resilience of the healthcare sector that it is being currently subjected to. Other sectors undergoing the litmus test are those of finance, investment, education and science & technology to name a few.

In the present paper, we take a look at some of the public policy challenges and opportunities that the virus has left us with.

### **Insights from the Spanish Flu**

The Spanish flu pandemic, arguably the most severe health crisis during the last 100 years, did have significant economic costs. Despite being masked by the war, it caused enormous loss of livelihood and industrial output globally. However, if we learn from the Spanish flu, the short-term economic loss and hardship led to enhanced opportunities later. During the 1918 crisis, one of the hallmarks of public policy was the non-pharmaceutical interventions (or NPIs) e.g. school, theatre and church closures; ban on public gathering; quarantine; restricted business hours; curtailment of trade and commerce; restricted travel and so on. It was found that rapid and more aggressive NPI resulted in a relative increase in manufacturing output, employment and bank assets post the pandemic. Cities that responded 10 days early increased the manufacturing output by around 5% during the recovery period; while an additional 50 days NPI increased manufacturing employment by 6.5% during the post pandemic period<sup>2</sup>.

### **Setting India in Context**

Let us take a closer look at India. Till date India has experienced 3,81,091 confirmed cases (as on 19<sup>th</sup> June, 2020) in which close to 12,600 persons have been killed by the virus. The first cases in India became apparent during February 2020 (with 3 reported cases on February 15); with the country initiating rigorous NPIs from mid-March. During the onset of NPI, India's total number of cases was around 332 with casualties that did not cross double figure. Under all reasonable arguments that does constitute an early response — compared to many countries such as Italy, USA or Spain. The fact that NPI is effective in controlling of the disease is apparent from the case of Sweden. The country despite being among the most advanced in terms of healthcare infrastructure

has recorded the highest per capita casualty in the world as it had not enforced NPIs.

Nevertheless, unequivocal evidence exists that NPI alone does not suffice in mitigating the crisis. Public lifestyle, state of healthcare infrastructure, health literacy, health monitoring, cross-sectoral participative initiatives etc play a crucial role. Thus, the success or failure of NPI in India should be viewed against the context of the existing state of the aforesaid parameters.

### **Public Health Scenario in India during the Pre-Pandemic Period**

India's investment in health infrastructure and healthcare delivery systems represented 3.5% of the GDP (in 2017 estimate)<sup>3</sup>. To place in context, this compares to 17.1% of GDP for United States, 11% of the GDP for Sweden, and 8.8% of GDP for Italy; some of the countries that were worst affected by the COVID. In health expenditure terms (per capita \$, PPP), while India spent \$253 during the pre-covid period, Italy was spending \$3619, Sweden \$5699, and United States \$10,246. It is quite evident therefore that the preparedness of public health infrastructure was abysmally low in India when the pandemic struck; although the higher investments by the more developed countries failed to control the outbreak either.

To compound the problem, in India most of the healthcare costs are borne by the people as a part of their own spending (known as out-of-pocket expenditure); in stark contrast to the other countries mentioned above. The percentage of current health expenditure that constitute out-of-pocket expenditure amounts to 62% for India (compared to say 15% in Sweden and 11% in USA). What this double whammy means to the Indian public at large is that while the individual is forced to spend extensively to get access to healthcare, the availability of infrastructure is scanty. While this might be manageable during ordinary times, the situation becomes non-negotiable during periods of health emergencies.

**Table – 1: Health expenditure in selected countries prior to COVID (Source: World Development Indicators, 2019<sup>3</sup>)**

Country	Expenditure (% GDP)	Expenditure (per capita \$ PPP)	Out of pocket expenditure – per capita (% of total health expenditure)
India	3.5	253	62
Sweden	11.0	5699	15
Italy	8.8	3619	—
United States	17.1	10246	11

## **Major Challenges for the Healthcare System:**

**Testing Capacity:** Reliable, wide-spread and rapid testing of individuals had emerged as one of the major impediments in disease management in India as with many of the developing countries. Contrary to popular belief, India did significantly well in ramping up the infrastructure. While India tested around 0.015 individuals per 1000 people daily in early April (i.e. during the early phases of NPI), the figure grew to 0.1 per 1000 people during early June i.e. a 10-fold increase. South Korea (known to be a success story), increased the daily testing rate from 0.22 individuals per 1000 people to 0.33 per 1000 people during the corresponding period i.e. a 1.5-fold increase. Italy witnessed an approximately 2.3-fold increase. Nevertheless, it was the overall coverage (in absolute terms) from the beginning (rather than the ramping up) in many countries that played a determining role e.g. Norway tested 1.7 per 1000 people daily; Qatar 1.8 per 1000 people; Russia 1.9 per 1000 people; and Luxemburg a whopping 4.09 per 1000 people daily<sup>4</sup>.

**Rural-Urban Divide in Access to Hygiene:** Ramping up of public health awareness and hygiene emerge as another major challenge. As per existing data (WDI 2019), percentage of total population who practice basic handwashing with soap and water stands at 59.5% at the national level; while the same amounts to 79.8% when the percentage of urban population is being considered. Thus, the large gap that exists between the rural and urban sector remains a key contributor for the spread of infection. It might also be mentioned that the widespread slum population of urban metropolises in India witness awareness index similar to or even worse than their rural counterparts.

**Migration of Unorganized Workforce:** Unorganized workforce comprises one of the major components of labour market in India. Lack of adequate health coverage coupled with the unhygienic living conditions make this a critically vulnerable group, susceptible to co-morbid conditions. Yet, the large-scale migration of such groups of people serve as effective vehicles for transmission of the disease. Definitive data however is not available about the extent of spread in infection that were attributed to such moving individuals.

**Inadequate Supply Chains:** Demand for medicines, medical devices and personal protective items underwent an exponential increase since the NPIs were first implemented. Manufacturing capacity for the production units and an organized supply of the products to the point of use has continued to remain inadequate. Such a sub-

optimal supply chain was a severe impediment in healthcare delivery during the emergent situations.

## **Changing Scenario during the Recovery Period**

While the context for the healthcare system during the pre-pandemic period contributed to the challenges faced by the country during the pandemic, the scenario is slated to be significantly different during the recovery period. During the period of recovery from the COVID outbreak, the healthcare priorities would weigh more towards preventive care rather than palliative care. Further, awareness, social hygiene, large scale monitoring and financial support would comprise important aspects of the recovery process.

It is too early to assess the success or failures of this phase, in view of the fact that the path of graded exit from NPIs have just begun. Evidence does indicate that the expanded base of testing would continue and more capacity would be added to hospital infrastructure for taking on the disease load in case of an increase. We have also seen more and more academic and scientific institutions across the country being mobilized for delivering the testing support, developing more affordable testing processes, building infrastructure to improve penetration of health delivery, and also engaging in training processes to expand the base of skilled professionals. Information repositories and analytics are being significantly ramped up to bridge the information black-box. Validation of results are being increasingly done through independent surveys.

The above said, one of the key challenges that remain is the interconnectedness of the initiatives. It is important for all the endeavors to operate on a common minimum platform to deliver the optimum results. Sustenance of the efforts to progressively enhance the available hospital facilities to cover wider cross section of the population would be yet another challenge to address.

Development of infrastructure that focus on efficient low-cost testing and surveillance would form an important aspect. As the infection has spread and continue spreading to remote areas, more and more of these diagnostic facilities during the recovery period are likely to operate either through stand-alone centers or through mobile centers. With a greater number of such facilities, there would be necessity for ensuring their networking and effective data sharing. Telemedicine is also likely to fill up the shortfall of qualified medical professionals on field.

## **Emerging Policy Challenges to Live with the Virus**

It has been frequently said that the flushing of the pandemic would be a protracted process and the world needs to live with the virus. One of the key hurdles of living with the virus is to ensure that usual economic and professional activities could be undertaken with concomitant social distancing and preventive measures. Newer institutional procedures and enhanced application of information & communication technologies (ICT) stand out as the key alternative. The approach nevertheless brings forth formidable policy challenges.

**Negotiating High Population Density :** Assuming that social distancing is an essential measure to contain the spread of virus, population density (i.e. persons inhabiting per sq km of land area) is an important collateral element that influence any form of interventions at this scale. Although India has made progressive improvements, the current figures are unfavorable. India's population density of 454 is amongst the highest in the world (compare say with 24 in Sweden or 35 in USA). This, coupled with the relatively moderate literacy rate (74% as per 2019 figures, WDI), makes any meaningful maneuver difficult. How do we keep the country running (that involves workplace interaction, daily commute, social interaction etc.) for so many individuals with social distancing norms and isolation criteria in place? Few countries in the world witnessed this challenge of absolute numbers to the magnitude India has.

**Table-2: ICT preparedness of selected countries (Source: World Development Indicators, 2019<sup>3</sup>; Network Readiness Index, 2019<sup>5</sup>)**

Country	Rank in Network Readiness Index	Access to Internet (% population)	Density of population (persons per sq km)	Number of mobile subscribers per 100 people
India	79	34.5	454	86.9
Sweden	1	95.5	24	126.4
Italy	34	63.1	—	138.2
United States	8	87.3	35	123

**Large Scale Adoption of ICT :** Access to the internet and availability of smartphones constitute baseline requirements for providing a workable ICT-enabled work environment. Data show that on a whole 34.5% of the Indian population have access to the internet, with the

urban households with internet amounting to 42% and rural households amounting to 14.9%. (National Sample Survey 2017-18). The corresponding national figures are 95.5% for Sweden, 63.1% for Italy; and 87.3% for United States. Number of mobile subscribers per 100 people work out to 86.9 for India, 126.4 for Sweden, 138.2 for Italy and 123 for USA. This said, it must be appreciated that out of the 86.9 subscribers per 100 people in India, not all are equipped with smartphones; nor does everyone use the appliance for other purposes apart from telephoning (WDI, 2019).

Network readiness index (NRI) is an indicator that reflects a country's preparedness to make use of technological interconnectivity and inter alia benefit from the power of ICT. The NRI 2019, places India at position 79 out of a total of 121 countries covered. To place in context Sweden, Singapore, Netherlands and Norway occupy the first four slots in this order.

Thus, the ability of the country to provide workable ICT connectivity ensuring delivery of digital solutions would represent a major policy imperative. While this by itself is a formidable challenge, while doing so we also have to subsume elements of data security, privacy, storage & warehousing and also protection against cyber-crimes.

**Bridging the Digital Divide in Education :** The educational system comprising schools, colleges and universities, have been among the worst affected by the pandemic. Enforcement of NPIs have necessitated closure of all such institutions. In order to compensate for the loss, the focus has increasingly shifted upon online education conducted in a distributed mode. Pedagogy, delivery and evaluation have all posed substantial challenges. It has also generated a substantial divide between the haves and have-nots with respect to ICT resources. As such, preparedness in accessing online teaching comprise the single major hurdle before the population at large. Understandably, the urban middle-class fair better compared to their rural counter-parts. The divide is even more prominent with the lower middle classes and the underprivileged category. Thus, providing access through equity is a key policy challenge that has to be addressed.

While access comprises a key impediment, other important aspects exist. One is the non-availability of adequate content; and the second is the lack of availability of content in local languages. Developing multi-language online textbooks as well as other supporting study materials is a key element that requires redress. There is

also an emerging need for the training of teachers to equip them with the skills of online teaching and delivery/evaluation of online education processes.

Primary and lower school level education pose further challenges. In view of the fact that they address to a more immature and young audience, it is important to customize contents that contain adequate multimedia and animation inclusions. Development of such animated multimedia contents is relatively scarce in India. Training of teachers to develop, integrate and use such contents is also a subject of great importance. Devices for access could emerge as yet another area of concern. Given the fact that majority of rural internet users take their smartphone as the device, it might not prove effective for primary grade children. Child-friendly access devices (e.g. tablets) are required to be made available in large numbers at affordable costs.

### ***Emerging Policy Opportunities***

While challenges are formidable, the post-Covid period is also likely to experience a flurry of opportunities, as a result of a probable rebooting of the economy. This might be leveraged to the country's advantage. Periods following the Spanish flu, which also coincided with the post-First World War period, witnessed similar growth opportunities particularly in the manufacturing sector<sup>6</sup>. One of the inherent advantages during these types of crisis is that the extremes of economic and social hardships often enable policy makers to implement sweeping changes that would otherwise have been difficult to execute. Such policies also more often than not result in paradigm shifts.

**Education :** Expansion of the online system of education is likely to be one of the major aspects of the post-Covid period. A KPMG-Google report on the Education in India 2021 published in 2017 has identified some of the major growth drivers of online education in India. Affordability, quality, equity in access and alignment of government digital initiative are among them.

The cost of education has been significantly high in India both at secondary as well as tertiary level. Low infrastructural cost, very large student base and the ease of access to a very large catchment in one go are among the major affordability parameters that helps attainment of economies of scale. Initiatives such as Swayam, Swayam-Prabha or the Rastriya Madhya SikshaAbhiyan, National Programme for Technology-enabled Learning (NPTEL) are all instrumental in driving IT-enabled education in India.

Recent times have also witnessed development of Virtual Laboratories (V-Labs) that cater to laboratory study requirement of high school, college and engineering students. However, awareness for such functionalities and the requisite training to make use of such utilities among the teachers and students alike is scanty.

The post-covid period is likely to see an explosive increase in adoption and use of these applications that had hitherto remained largely under-utilized. As more and more schools, colleges and universities switch to conducting classes over online platforms, e-learning initiatives are poised to grow significantly. Along with it demand for such application development, content development and need for trainers, training modules and hand-holding organizations to run through such applications would also grow concomitantly. This is likely to have a positive impact on growth in employment and entrepreneurship.

The initial hindrances apart, the imminent changes in the educational scenario of the country would have long term implications. While education could eventually transform into a learner centric enterprise (from the teacher centric one that it currently is), online systems will also instill the much-needed transparency element in the teaching and evaluation systems. Assuming that the Internet and bandwidth constraints are taken care of, there would be a massive expansion of reach and catchment of students being catered to. These would not only drive down cost, but would enhance gross enrolment ratio. Reduction in printing cost, lowering of education costs, new employment opportunities in areas of content creation and teacher training initiatives, reduced logistic impediments in education, and formalization of the sector could be some of the perceived benefits of this change process. Major opportunities and returns are expected from initiatives like the National Digital Library. It is important therefore for the government to evolve policies that patronize online education, provide seamless internet connectivity to remote locations and financial incentives to switch into this mode. Such interventions would be instrumental in reaping the new opportunities.

**Strengthening R&D Capacities:** Indian R&D institutions have a significant capacity in various domains. Organizations belonging to different central agencies such as DST, CSIR etc; those under various State governments; and those under the private sector, have contributed with knowledgebase and technologies during different national and global needs. Such institutions, along with the various

components of the academia (universities, IITs, other institutions of higher learning etc), have also been instrumental in training and mentoring of skilled manpower. The recovery period for Covid and beyond, is likely to witness a greater involvement of such institutions in addressing mission mode projects. While we have already seen emergence of several Covid-linked technologies from organizations like the DRDO, CSIR and so on; along with funding of proposals for carrying out R&D in the domain e.g. from DST and CSIR, limitations persist. For example, there is a lack of enabling mechanisms that might allow faster ways of drugs and diagnostics to be subjected to clinical trials; there is inadequate infrastructure for effective scale up of lab technologies; there is a lack of more seamless industry-institute protocols to fast track bench-to-bed translation. This is an appropriate juncture to plug such gaps with appropriate policy interventions. There is also a significant opportunity of achieving a greater inter-agency synergy to accelerate a more integrated approach.

As mentioned previously, the need for continued interventions would require availability of increasing number of skilled personnel to deal with diagnostic, data analysis and service delivery. R&D institutions in partnership with industry could serve as effective platforms to achieve this goal.

**Evolving New Paradigms in Universal Health Coverage :** The post-Covid period would see an exponential increase in demand for universal health coverage – testing, treatment and monitoring. It would be imperative to have defined actors and facilitators; defined financial protocols; and defined institutional mechanisms to attain the goal. While it is unrealistic and also improper under Indian context to device centralized healthcare system, there is certainly a necessity to have an integrated policy framework for stakeholder convergence. Formalization of the healthcare system in line with the developed countries through national health cards, universally accessible patient databases etc represent important steps of providing health coverage thereby reducing out-of-pocket expense. It is felt that the post-Covid times would also witness demand for the rightful expansion of telemedicine and more customized patient care procedures.

**Invigorating Local Production Systems and Economies :** Contrary to popular beliefs, migration of skilled labour in India is quite low. Nevertheless, the country's plight with migration of unorganized sector labor was apparent during the pandemic. The two constraints

considered together could represent an excellent backdrop of invigorating local production systems. India's resource pool is remarkably clustered across the country, with specific regions known for its specific strengths and weaknesses. Options for leveraging the local production / consumption patterns is often seen as a major pathway to enable equitable development. It is known that a significant share of Indian industrial output comes from the micro, small and medium enterprises (MSMEs), that occur in clusters. These clusters represent local production systems that rely essentially on local resources and manpower. Opportunities to leverage these clusters through technology and capacity building can build up significant industrial base to drive economic development.

### ***Lessons from the COVID***

The Covid crisis has had a mixed effect in the national context. While on one hand it has put to critical test some of the fundamental social indicators of the country such as access to healthcare facility or minimum income or basic amenities of public health and hygiene, it has on the other hand allowed the country to take a closer look at some of the untapped resources and potentials.

Severe shortage of hospital beds and ancillary facilities and also an acute shortage in capacity of manufacturing personal protective equipment (PPE) has been noticed. The availability of qualified health care professionals has also been found to be sub-optimal. These shortages can be attributed to limited manufacturing capacity, limited infrastructural capacity, inadequate educational/training facilities, and more importantly an inadequate planning process to foresee the future requirements. Nevertheless, we have managed to device innovative approaches by way of commissioning diverse organizations/public sector & private sector units for manufacturing of items such as PPEs or ventilators; and often resorting to non-conventional approaches to palliative care such as home-based quarantine and isolation under supervision of hospital doctors.

Research organizations and academia have exhibited extraordinary resilience and ability to deliver solutions. We have seen quick repositioning of research focus in several public funded R&D institutions. There has also been a spurt of project formulations and innovative ideas to contain the infection both in short term and long-term. Development of rapid diagnostics, repurposing existing drugs for immediate use, screening and development of new API, development of technologies for affordable medical equipment, and so on are some of the examples.

Yet, in the process we have realized the serious impediments posed by our outdated public procurement systems, lengthy processes of allowing APIs into clinical trials, and a low investment in healthcare expenditure (a mere 3.5% of the GDP). While we debate on the pros and cons of increasing the number of seats in our medical colleges and its implication on the quality of medical education, we have painfully realized the effect of having a sub-critical number of qualified doctors. As per latest WHO data India's density of medical doctors per 1000 population works out to 7.7, as compared to 53.99 in Sweden, 40.93 in Italy and 25.94 in USA<sup>7</sup>.

As we grappled to revive the education sector from its grinding halt, we realized the folly of not making the relevant institutions and its people substantially equipped with ICT resources. We have realized the implication of low bandwidth in our Internet connectivity; and not having our own back-end infrastructure to insulate us against the possible snooping by foreign powers; and not having a networked infrastructure to maximize the utilization of resource.

During our efforts to restrain the economic downslide, it was clear that the MSME clusters of the country, which represent the key work horses of the economy, are remarkably isolated and insular from one another. This has not only made them vulnerable to crises like the present ones, but also made them less productive. We have never taken a comprehensive outlook of leveraging their local production systems with national or global participation – a paradigm that has revolutionized European clusters several decades ago.

The country has reached a cross road wherein it has to make several important choices. We need to decide for instance the way we shall run our professional establishments; we need to decide on the future of our educational system; we need to decide on the various options of livelihood and investments. We are likely to witness new policies that would target various sectors, but have a common deliverable of achieving formalization of the economy. It would be imperative for us to recognize the fact that benefits of a formal economy far outweigh an informal system.

**What Policies can do and what it cannot :** While we have summarized some of the policy options that India could adopt to rebound itself, we must recognize that policy interventions do not represent a be-all and end-all measure. While it does provide a reasonable framework, policies seldom suffice in ground-level execution. For

example, policies to augment expenditure in healthcare does not necessarily result in utilization of the enhanced resources in our healthcare systems; similarly enabling policies for online education and training does not automatically translate into delivery in schools and colleges. It is a universally accepted fact that enabling policies should be backed up by robust institutional support in order to deliver the desired result. Thus, if we look towards leveraging the new opportunities while addressing the challenges of COVID, we should also pay adequate attention to resurrect and energize our institutions.

**Why Do We Need Institutional Reforms? :** A very large number of policy interventions cannot be implemented and a large number of policy opportunities cannot be leveraged owing to outdated systems of our institutions. Ramping up the production capacity of MSME with Industry 4.0, or expanding the pervasiveness of healthcare delivery with artificial intelligence and IoT would not be achieved merely with adoption of these technologies. It would require large scale institutional reforms in the manufacturing, financial, labour, logistics and all other ancillary sectors. Skilling and re-skilling of our human resources to enable them carry out newly emerging job roles, networking our institutions to maximize output with minimal redundancy, ability of institutions e.g. hospitals, diagnostic laboratories, universities, R&D institutions, manufacturing enterprises etc to adapt quickly to the changing needs are some areas that might prove crucial. Consolidating supply chains by providing direct market access to stakeholders is yet another key institutional reform. Lastly, institutions and enterprises need to be fully receptive to technology for their activities and sustenance. Needless to say, such a transformation would require big ticket institutional reforms.

### **Conclusion**

The Covid effect is likely to ebb away in a year or two. Yet it is important to equip ourselves from similar resurgences in future. Stronger and resilient institutions, technology-driven economy, skilled and multi-tasking workforce, formalization of the industrial sector and a baseline guarantee to social security would probably tune the country to confront such challenges with greater ease.

### **Acknowledgements**

The author wishes to acknowledge the fruitful discussion with several friends and peers on impending

policy issues concerning COVID. The moral support of Dr K. Muraleedharan, Director CSIR-CGCRI is also thankfully acknowledged. □

### **References**

1. <http://www.covidworldometer.info> (Accessed: 19.06.2020)
2. Brainerd, Elizabeth & Siegler, Mark V, 2003. "The Economic Effects of the 1918 Influenza Epidemic," CEPR Discussion Papers 3791, C.E.P.R. Discussion Papers.
3. World Development Indicators 2019, <http://databank.worldbank.org> (Accessed 04.06.2020)
4. Coronavirus Pandemic Data Explorer, <https://ourworldindata.org/coronavirus-data-explorer> (Accessed 19.06.2020)
5. Network Readiness Index 2019, [www.portulansinstitute.org](http://www.portulansinstitute.org) [www.networkreadinessindex.org](http://www.networkreadinessindex.org)(Accessed 06.06.2020)
6. Nicolaci da Costa, Pedro. "Pandemic Economics – Lessons from the Spanish Flu in 1918, Forbes Report (April 03, 2020) <https://www.forbes.com/sites/pedrodacosta/2020/04/03/pandemic-economics-lessons-from-the-spanish-flu-in-1918/#1aeb98e7797a>
7. WHO Global Health Observatory, <https://apps.who.int/gho/data/node.main> (Accessed 19.06.2020)

*Received : June 19, 2020*