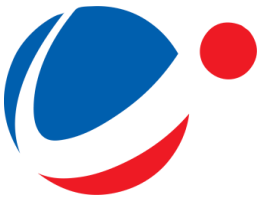

UNDERSTANDING COVID-19: IMPLICATIONS AND RESPONSES

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1. SUMMARY

In the past nuclear warfare was considered a significant global risk. Going beyond the traditional analysis, water wars were also anticipated to be the potential cause of global conflicts in the recent decades. However, even as these scenarios remain a concern, the world is right now witnessing an unprecedented global crisis caused by a microbe. The novel coronavirus has spread to and wreaked havoc in more than two hundred countries and territories. As of March 28, 2020, COVID-19, the deadly disease caused by the novel coronavirus has infected 571,678 and killed a staggering 26,495 people.

This virus is transmitted as commonly and rapidly as the virus causing the common cold (rhinovirus). The symptoms of COVID 19 bear close resemblance with cold or flu, which include fever, cough and shortness of breath.

Owing to the similarities between the genome structure of COVID-19 coronavirus and Severe Acute Respiratory Syndrome (SARS) coronavirus, the current 'novel coronavirus' is called SARS-CoV-2. But unlike SARS (which broke out in 2003), COVID 19 is yet to be tamed and controlled by mankind, and an effective vaccine is keenly awaited. The World Health Organisation has declared COVID-19 a pandemic owing to the extent of its spread across the globe.

Within a month of its reporting on 31 December 2019 in China, the coronavirus was first detected in India on 30 January 2020. Although it made a slow and gradual start, it has scared the nation with its rising pace. As of 28 March it has infected more than 800 people and caused 19 deaths.

In the wake of this growing concern, this report seeks to provide a comprehensive coverage of this untoward situation. It aims to throw light upon the novel coronavirus, with a special emphasis on the necessary and urgent interventions and suggestions for policy-making at multiple levels involving the central and state governments, businesses & private organisations as well as citizens.

The report does the above by analysing a multitude of aspects and capturing the current global trends, the present scenario in India as well as the forecast for India considering these trends. Additionally, the report discusses the concerns before India vis-a-vis COVID-19 and the steps taken by India to contain the virus and tackle the situation. Further, it seeks to draw from the experiences of other countries by highlighting their successful interventions in reversing its spread.

The report finally addresses India's current preparedness level in this serious situation and explains how India can and must prepare for a post-COVID-19 scenario.

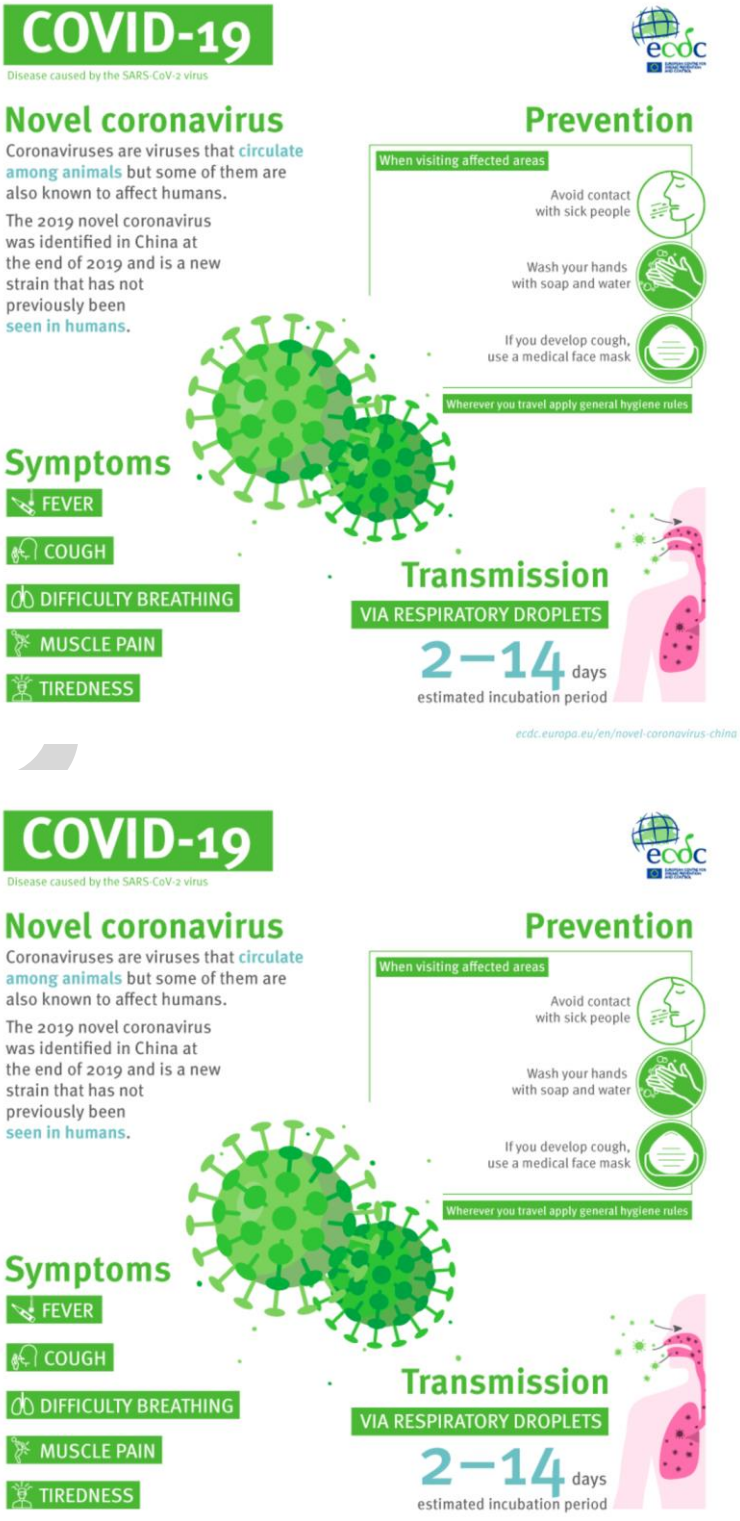
2. INTRODUCTION

The beginning of the present 'novel coronavirus' crisis can be traced to **Wuhan**, a city in China where the virus originated and soon spread across the country as people moved from one part of the country to another. The response of the Chinese government ranged from denial and hiding the information, to eventual lockdowns, curfews and ramping up their healthcare to treat the patients. Gradually, it spread globally to almost all the countries with varied responses of the respective national governments. In the case of India, the country is at a critical juncture presently where there is a massive scare of possible deadly effects of coronavirus, if we are not able to limit its spread.

At this critical juncture, when we are at the mercy of a microscopic biological agent, solidarity, awareness and preparedness are the pressing needs of the hour. Although **'social distancing'** is the buzzword, the world is now closer and more connected than ever before. Tackling **COVID-19** needs a warlike response against a common enemy. Doctors and nurses have turned into soldiers overnight. Political leaders are preoccupied with planning and strategizing against the enemy. But most importantly, the role people play will be immense in defeating this enemy.

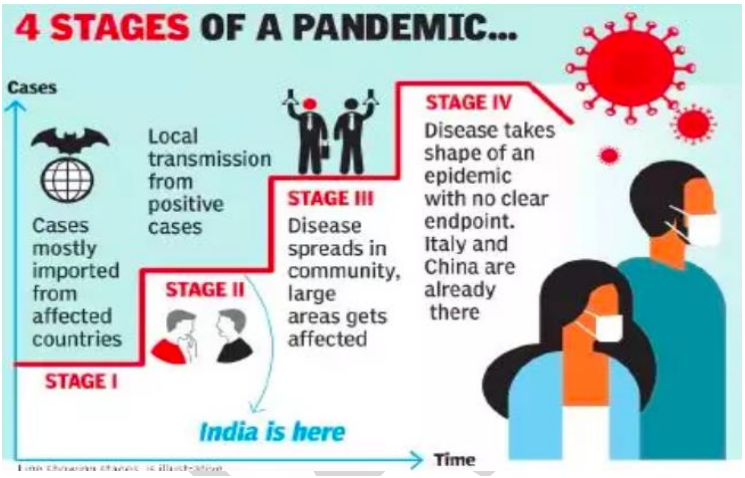
3. ABOUT THE CORONAVIRUS

- Coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to the more severe diseases such as the Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV) and the current COVID-19.
- These viruses consist of a core of genetic material surrounded by an envelope with protein spikes, which gives it an appearance of a **crown** (Latin: corona).
- Coronaviruses are **zoonotic**, meaning they are "transmitted from animals to humans."
- In the current outbreak, it was found by the scientists that this Coronavirus was a new strain. Thus, it was named **'novel'** or new Corona with the appellation of **'nCorona'**. It was later renamed as **SARS-CoV-2** (severe acute respiratory syndrome coronavirus 2) by the International Committee on Taxonomy of Viruses, owing its similarities in genome structure with that of SARS virus.
    - The SARS-CoV-2 is believed to have taken the following sequence- It originated from **bats**, and then transmitted to **pangolins** to **humans**. The sequence is yet to be confirmed. Until



Source: European Centre for Disease Prevention and Control

the source of this virus is identified and controlled, there is a risk of reintroduction of the virus in the human population and the risk of new outbreaks like the ones we are currently experiencing.
    - It was the **wet markets** (selling live meat, fish, reptiles and wild animals) in Wuhan, where the virus is believed to have spawned, precisely the Huanan Seafood Wholesale Market.
    - The problem with these Chinese wet markets was that all sorts of animals, ranging from fowl to wild animals, were sold there for their meat (for example monkeys, python, dogs, hares and pangolin etc.) without due care of hygiene.
- In these wet markets, the live animals were housed in very bad conditions and lived under a lot of stress. Further, stress made it conducive for such animals to get sick and shed the virus.
- **Mode of transmission**: It is believed that the virus was transmitted to humans through the fluid secreted from the respiratory system of the wild animals. Further, it spread from humans to humans while coughing and sneezing, shaking of hands, making contact with a surface or object that has the virus etc.
    - On rare occasions, a coronavirus may spread through contact with faeces.



Source: ICMR

- **Spread:** The Incubation Period (the time between catching the virus and the beginning of symptoms of the disease) for COVID-19 range from 1-14 days, with the median incubation period of just over five days.
    - The **R0 (pronounced R-nought)** (average number of people who will catch the disease from one contagious person) of the virus is estimated to be between 2 and 3, and the mortality rate is of around 3% but the rate varies and is amenable to change due to different factors such as spread in different locations, response mechanisms and age profile of the infected.
    - **Symptoms of infection by COVID-19**: Common signs of the infection include respiratory symptoms, fever, cough, shortness of breath and breathing difficulties. In more severe cases, the infection can cause pneumonia, severe acute respiratory syndrome, kidney failure and even death.
- **Diagnosis:** The infection can be diagnosed by reverse-transcription polymerase chain reaction (RT-PCR). This test identifies the virus based on its genetic fingerprint.
- **Prevention**
    - Wash your hands regularly for 20 seconds, with soap and water or alcohol-based hand rub.
    - Cover your nose and mouth with a disposable tissue or flexed elbow when you cough or sneeze.
    - Avoid close contact (1 meter or 3 feet) with people who are unwell.

CORONA-VIRUS VACCINE

- A vaccine can be prepared either based on genome sequencing of the Virus or by finding out about the Proteins which make up the virus.
- However, since COVID 19 mutates (in structure), it becomes difficult to develop a vaccine based on the above methods.
- Further, it requires multiple stages of development-from animal trials, to human trials, to regulatory approvals and finally, the manufacturing.
- Initiatives for the development of **drugs** to cure the infection/ disease are also in progress under the WHO Solidarity Trial.

Some of the initiatives taken towards this are-

- **Gilead's remdesivir** is being studied in several clinical trials around the world. In China, Gilead is recruiting about 1,000 patients diagnosed with the coronavirus to determine whether multiple doses of Remdesivir could reverse the infection.
- **Moderna's product** is a synthetic strand of messenger RNA, or mRNA, designed to convince bodily cells to produce antibodies against the virus.
- **CanSino Biologics**- involves taking a snippet of the coronavirus' genetic code and entwining it with a harmless virus, thereby exposing healthy volunteers to the novel infection and spurring the production of antibodies.
- The Oxford University vaccine, known as **ChAdOx1**, is one of five frontrunners in vaccine development around the world.
- US biotech Moderna gave its first vaccine shot to a person in Seattle earlier this week.
- In Germany, CureVac is working on a vaccine, while others are in development in China

- Stay home and self-isolate from others in the household if you feel unwell.
- Don't touch your eyes, nose, or mouth if your hands are not clean.

- **Treatment**: At present, there is no verified treatment for the new virus, and no vaccine is available to prevent it.
- The **current situation is unique** due to various factors:
  - The spread of the virus is fast and our response clearly lagging.
  - There is a 10-12 days lag between the infection and the symptoms of the virus. The possibility of asymptomatic people, further, worsens the situation, as in the meantime they may spread the virus without even knowing it.
  - The health care system is not well-equipped to deal with the repercussions.
  - Italy, with one of the best healthcare systems in the world (as per the WHO), has failed to contain the pandemic and is overwhelmed by the number of patients. One can just imagine what could happen in India, whose healthcare system ranks 112.
  - Experts claim that our doctors and nurses are not adequately trained to deal with such a situation.
  - Further, some people are in a state of denial- any delinquency can put the country in a state of despair.
  - Research related to the n-coronavirus (COVID-19) is underway. The issue is that nobody knows for certain the exact behaviour of the virus.
  - Recent reports suggest that cured patients are also at the risk of a re-infection. This is primarily due to the fact that the virus can live up to 4 weeks in the faeces of the cured patient, even if the nasal swab samples are found negative.

4. CURRENT GLOBAL TRENDS

- WHO has declared Covid-19, a pandemic, owing to its spread across the globe.
- The COVID-19 has spread to over 200 countries, areas or territories to date. Further, the virus has caused severe respiratory diseases in about 20 percent of the patients and has killed around 3 percent of the confirmed cases. (data updated as on March 18th, 2020)
- Global Cases have crossed 571,678 and around 26,495 deaths have taken place. Over 1, 13, 000 people recovered, as per the WHO. (data updated as on March 28th, 2020)
- Although it originated in China, the current epicentre is in Europe with the death toll in Italy and Spain crossing that of China.
- In China, the spread of the virus has been checked due to strict governmental measures and normalcy is beginning to come back.
- China's neighbouring countries such as South Korea, Japan, Taiwan have been able to effectively deal with the coronavirus by strict measures and using past experience of dealing with SARS, Swine flu etc.
- The USA has become the first country to report more than 1 lakh coronavirus cases.
- Nearly 80 countries have asked the Washington-based IMF for emergency finance.
- Central Banks in many (50 plus) countries have cut down their interest rates in order to boost their economies.
- More than 100 countries have imposed travel restrictions.
- The International Monetary Fund said that it expects a global recession this year that will be at least as bad as the downturn during the 2008 financial crisis, and will be followed by a recovery in 2021.

5. CURRENT SCENARIO IN INDIA

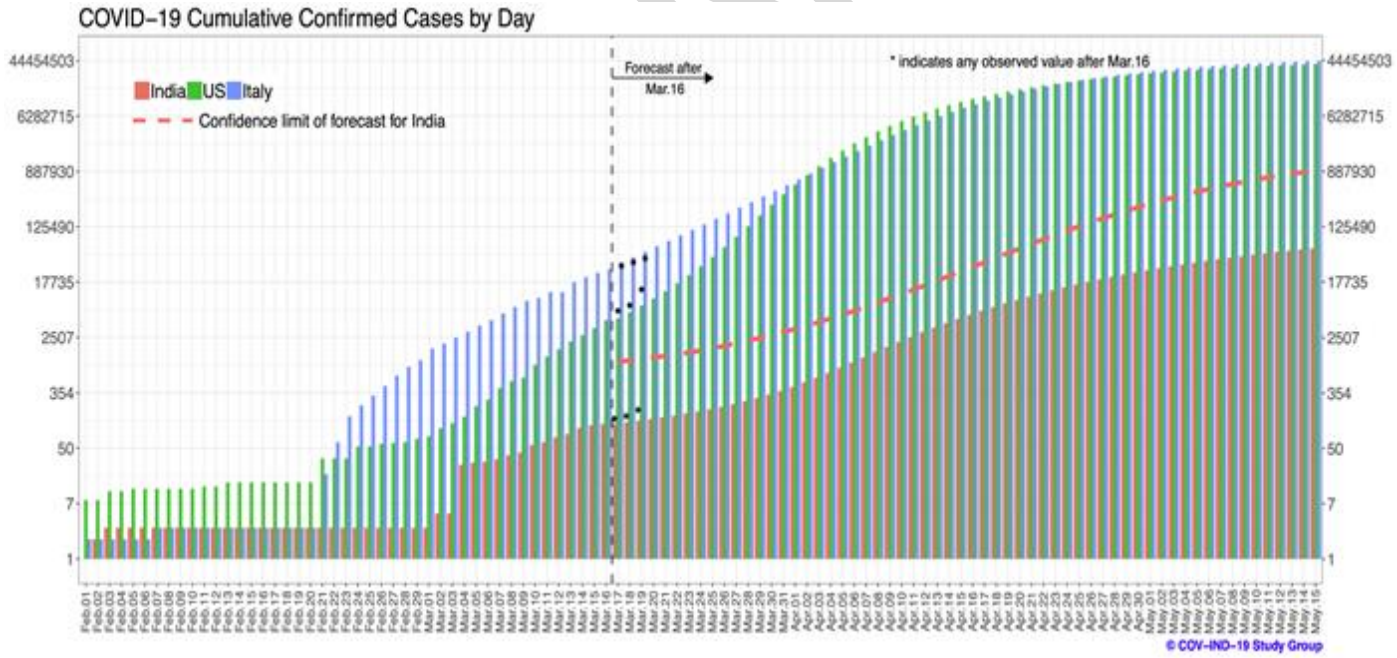
- India's picture looks bleak as she is witnessing a more sudden and rather drastic increase in the number of confirmed cases.
- However, **it is reassuring that India is currently at Stage 2** of the coronavirus spread, which means that community transmission has not yet taken place to any noticeable extent (this is as per the government's claim, though many experts beg to differ on the matter)
  - It took India forty days to reach the first 50 cases. Thereafter, it took five more days to reach 100 cases, three more days to reach 150 cases and then just two more days to reach 200 cases.
  - Studies show that India is in line with the USA and Italy with respect to the progression of cases.

6. FORECASTS FOR INDIA

- At this rate, India is facing the prospect of rise in the numbers of cases by the next month.
- The CoV-Ind-19 Study group report, based on plotting India's trajectory with that of Italy and the USA, predicts the cumulative number of cases in India on **March 31** was 379, on April 15 - 4836, and on May 15 - 58643.
- As per the report, these predictions are modest considering the limitations posed by the low frequency and scale of testing in India
    - We have already breached the **March 31st** number with **727** cases on **March 27th** itself.
- According to Dr Ramanan Laxminarayan, founder and director of the Center for Disease Dynamics, Economics & Policy (CDDEP) in Washington, D.C., India could also see 20% to 50% of the population getting infected. This means between 300 million to 700 million people may get infected.

Timeline for the spread of COVID 19 in India

- **30 January**- First case is reported in the Indian state of Kerala
- **2-3 February**- Two more cases are reported in Kerala, again both are students of the Wuhan University.
- **1-2 March**- Two more cases are reported in India, a 45 year old man based in Delhi (with travel history to Italy) and another 24 year old engineer in Hyderabad (with a travel history to UAE)
- **4 March**- 14 Italians and one Indian are reported to have tested positive for coronavirus.
- **12 March**- India reports first death, a 76 year old from Kalaburgi, Karnataka dies. He had a travel history to Saudi Arabia.
- **13 March**- India reports second death. Maharashtra alone reports 17 cases.
- **15-16 March**- Uttar Pradesh confirms 12th case and Odisha reports its first case. The total number of cases in India crosses 100th mark.
- **21 March**- The number of cases rises to 283.
- **23 March**- 470 (approx.) cases reported in India, with 9 deaths registered. 30 states and Union Territories have declared lockdowns. Out of the 470, 34 patients are being said to have recovered. So, the active number of cases is 440 (approx.).



Source: COV-IND-19 Study Group

- However, these experts have also argued that the numbers may remain low if timely and stringent measures are taken.

7. CONCERNS BEFORE INDIA

- **Large population:** India is the 2nd largest populated country in the world. Therefore, community transmission would lead to an exponential increase in the number of cases of infection.
- **Literacy Rate:** India's literacy rate is 74.04%. This is just the average, with the rates varying from state to state. A vast majority of the population is semi-literate, illiterate or poorly educated. They lack complete knowledge about a Coronavirus like epidemic and the preventive measures to be taken.
- **Low levels of hygiene-** including sanitation and the use of disinfectants.
- **Health Infrastructure:** Italy, USA and China, the worst affected countries, have 3.2, 2.8, and 4.3 hospital beds per 1000 people respectively. Whereas, India just had 0.5 beds per 1,000 people (as of 2017). Also, the total ICU capacity is less than 1, 00,000. This will seriously affect our treatment response to critical patients.
    - Unlike China, India does not have the capacity to ramp up the production of emergency medical supplies.
- **Lack of Health Professionals:** India has a 1:1445 doctor-patient ratio, against the WHO recommendation of 1:1000. Similar numbers are prevalent in the case of other health professionals like paramedics and nurses.
- **Weak Implementation Capacity:** Government agencies responsible for the enforcement and regulation of law and order have had a dismal track record.
    - **Poverty** is the major concern for India. India houses the largest number of poor people in the world after Nigeria.
    - There are a large number of **informal workers** like housemaids, wage labourers etc. who might find it difficult to cope up with the situation like a lockdown without support from the government or civil society organisations.
    - Issues related with large numbers of **migrant workers** such as wage loss and uncertainty may cause distress reverse migration. This would be a logistical challenge as well as a potential source of community transmission.
- **Fake news and vague information** related to the containment of the virus etc. circulated on social media platforms has the potential to create panic.
- **Economic Slowdown:** The economy is already under a slowdown which has been accentuated by restrictions imposed due to COVID-19.
    - Since unemployment increases during a slowdown or recession, job losses, particularly in the unorganized sector are likely to be acute.

8. STEPS TAKEN BY INDIA

LOCKDOWN AND QUARANTINE	• When, on the 11th of March, the WHO declared the novel coronavirus (COVID 19) outbreak to be a pandemic, India lost no time in taking the first step to quarantine itself.
	• The Central Government advised all the states and the Union Territories to invoke the provisions of the **Epidemic Diseases Act, 1897**, which would enable them to enforce advisories as and when needed.
	• The Centre took the unprecedented decision to **suspend all visas, barring select categories, till the 15th of April**, effectively closing its borders for a month. The decision was taken at a meeting of the GoM (Group of Ministers), constituted to review, monitor and evaluate the preparedness and measures taken to fight the COVID outbreak.
	  ○ Quarantining of all incoming travellers had been done- marking self-quarantine stamps on the hands of people showing no symptoms and alienating people showing symptoms and quarantining them.
	  ○ The government also ordered for the suspension of railways, intercity bus services, urban metros, closing down of shopping malls, markets, and other non-essential services in various states of the country.
	• In the latest travel advisory, the government banned all international commercials flights into India from the 22nd of March 2020 for a week.
	  ○ The earlier visa restrictions remain in force.

	○ Universal health screening continues at all points of entry- Thermal Scans of the international passengers at Airports and of border-crossings is being done. • Addressing the nation on the 19th of March 2020, the Prime Minister, Mr. Narendra Modi urged the people to practice self-restraint, and adopt social distancing, including '**Janta curfew**' (voluntary self-isolation) on Sunday, the 22 March 2020 from 7:00 AM to 9:00 PM. • On **24th March,** the Prime Minister announced a 21-day **nationwide lockdown** across the country. • The announced lockdowns, and suspension of public transport, closure of public places and offices were aimed at reducing the growth rate of the virus, and help **'flatten the (transmission) curve'**. • This would prevent our health infrastructure from crashing.
FINANCIAL PACKAGE	• **AN ECONOMIC RELIEF PACKAGE WAS ANNOUNCED BY THE CENTRAL GOVERNMENT** • The Government of India announced a **₹1.7 lakh crore financial package** in order to protect the weaker sections of the society from the economic fallout of Covid-19 in the country. • The **Pradhan Mantri Gharib Kalyan Yojana** had been announced within 36 hours of the lockdown and it would take care of the needs of poor and migrant workers, farmers, women, pensioners, widows and the disabled. • Insurance cover- Rs. 50 lakh per person for doctors and medical workers fighting COVID-19 • 80 crore poor people will receive 5 kg of wheat or rice and 1 kg of preferred pulses for free every month for the next three months. Free grain could be availed in two instalments. • The MGNREGA wage has been increased to Rs. 202 a day and 13.62 crore families are expected to benefit thereof. • 20.4 crore Jan Dhan women account holders would get Rs. 500 per month for the next three months. • 8.3 crore families living below the poverty line will be eligible for receiving free cylinders during the next three months. • Wage-earners earning below Rs. 15,000 per month who work in businesses having fewer than 100 workers would receive 24% of their monthly wages into their PF accounts for the next three months • The Central government directed the state governments to utilise the Construction Workers Welfare Fund to give relief to the 3.5 crore registered workers • 3 crore senior citizens, the disabled and widows amongst the poor would receive an ex gratia of Rs. 1,000 • The government would allocate Rs.2,000 amongst 8.7 crore farmers during the first week of April, under the existing PM Kisan Yojana
INTERVENTION by RBI	• **Targeted Long Term Repos Operations (TLTROs)-** Reserve Bank will conduct auctions of targeted term repos of up to three years tenor of appropriate sizes for a total amount of up to ₹ 1,00,000 crore at a floating rate linked to the policy repo rate. • **Policy Rate-** ○ **Cash Reserve Ratio-** Reduction of 100 basis ○ **Repo Rate-** Reduction of 75 basis points to 4.4%. ○ **Reverse Repo Rate-** Reduction of 90 basis points to 4%. ○ **Marginal Standing Facility-** Increased from 2% to 3%. • **Moratorium on term loans-** All commercial, regional, rural, NBFCs and small finance banks are being permitted to allow 3-month moratorium on payment of instalments in respect of all term loan EMIs outstanding on March 31. • **Deferment of Interest on Working Capital Facilities-** In respect of working capital facilities sanctioned in the form of cash credit/overdraft, lending institutions are being permitted to allow a deferment of three months on payment of interest in respect of all such facilities outstanding as on March 1, 2020.

	• **Easing of Working Capital Financing-** In respect of working capital facilities sanctioned in the form of cash credit/overdraft, lending institutions may recalculate drawing power by reducing margins and/or by reassessing the working capital cycle for the borrowers. • **Deferment of Implementation of Net Stable Funding Ratio (NSFR)-** As part of reforms undertaken in the years following the global financial crisis, the Basel Committee on Banking Supervision (BCBS) had introduced the Net Stable Funding Ratio (NSFR) which reduces funding risk by requiring banks to fund their activities with sufficiently stable sources of funding over a time horizon of a year in order to mitigate the risk of future funding stress. • **Deferment of Last Tranche of Capital Conservation Buffer-** As per Basel standards, the CCB was to be implemented in tranches of 0.625 percent and the transition to full CCB of 2.5 per cent was set to be completed by March 31, 2019. It was subsequently decided to defer the implementation of the last tranche of 0.625 percent of the CCB from March 31, 2019 to March 31, 2020. Considering the potential stress on account of COVID-19, it has been decided to further defer the implementation of the last tranche of 0.625 percent of the CCB from March 31, 2020 to September 30, 2020. • **Permitting Banks to Deal in Offshore Non-Deliverable Rupee Derivative Markets-** to permit banks in India which operate International Financial Services Centre (IFSC) Banking Units (IBUs) to participate in the NDF market with effect from June 1, 2020. Banks may participate through their branches in India, their foreign branches or through their IBUs.
OTHER STEPS	• Central ministries along with states/UTs have taken urgent steps to strengthen surveillance, contact tracing and isolation, laboratory capacity, quarantine facilities, and ensure the availability of adequate personal protective equipment, trained manpower and rapid response teams for the management of COVID-19. • In order to increase the supply of coronavirus test kits, the government had announced that it would process applications for their manufacture or import within a specific time-limit (seven days, at the time). • The applications for research and development of drugs of vaccines to treat COVID-19 were announced to be processed on high priority. • The central government has ordered a million test kits, and decided to test the suspected cases. • With COVID-19 being declared a notified disaster, the state disaster response funds, constituted under the Disaster Management Act, 2005, would now be available with state governments for response measures. • Helpline numbers and detailed advisories and guidelines are available on the Union Home Ministry's website.

9. LESSONS FROM OTHER COUNTRIES, COMPANIES AND OTHER STAKEHOLDERS

SOUTH KOREA	• It has one of the lowest mortality rates at 0.77%, against the global average of 3.4%. • **Early measures and proactiveness**: When the Chinese scientists first published the nCoronavirus virus genetic sequence for the first time in January, at least four South Korean firms quietly began developing and stockpiling test kits alongside the government - well before the country had its first outbreak. • **Widespread Testing**: It is testing 80,000 people per week (the highest in the world). South Korea gave more weightage to actively searching for and diagnosing nCoronavirus patients in order to break the chain of transmission. It also introduced **drive-through testing**, allowing people to be checked for disease without even leaving their vehicles. • **Emergency Use Authorization (EUA)**: South Korea was the first nation to issue COVID-19 related EUA. As per the EUA, it allowed the use of in-vitro diagnosis kits. EUA is an innovative biodefense policy adopted in response to the public health emergency. It allowed the use of novel unapproved medical countermeasures in case of public health emergencies when no countermeasures were available.

	• An application "**Corona100m**" was developed to let the people know of vulnerable places within a 100 metre radius. Credit card histories, mobile usage data, CCTV footages were looked into to shortlist the probables. • **Prioritizing hospitalization**: High risk patients with underlying illnesses (comorbidities) were given priority hospitalization. The rest were kept in isolated places with basic health treatments to avoid deaths. • **Local monitoring teams (bio-surveillance):** Such teams were set up to call twice daily to make sure the quarantined stay put and were asked about their symptoms. • **Use of Technology**: Every registered number also received alerts about the nearby infection paths, so that citizens could avoid areas where the virus was known to be active. Moreover, the South Korean government created a GPS-enabled app to monitor those under quarantine and set off an alarm if they ventured outdoors. **Analysis** • It succeeded in decreasing the rate of new confirmed cases to less than 100 per day through massive testing and through the effective use of technology. However, mass-testing and early detection may have afforded South Korea the luxury of being able to avoid declaring a total shutdown. • **Testing of asymptomatic people had revealed a "high number" of infections**. This could be a warning for a country like India, which is only testing patients with symptoms.
JAPAN	• **Firewall Strategy:** As per this strategy, it bans the entry of travellers from hard-hit regions of China and quarantines the suspects. This kind of strategy is similar to the Japanese military concept of "Mizugiwa Sakusen"- a military doctrine of repelling invaders as soon as they reach the shore. • "**Clean bill of health**": It was a medieval age tactic as per which if a passenger on a ship did not pass health inspection, he or she would need to remain anchored offshore for at least 40 days in order to prove that they had no disease • "**Face mask culture**": Wearing masks is a routine for every Japanese citizen– 3 in 10 people are seen wearing masks, even on days of no outbreaks. When the news of the spread of Coronavirus was received, nearly 80% of the population was seen wearing masks. • **Japanese Flu drug**: It was viewed as highly effective in treating the nCoronavirus patients.
CHINA	• **Strict Lockdown and Social Distancing measures**: For instance, Wuhan virtually went into lockdown with checkpoints blocking the main roads leading out of town. • **Extensive Public monitoring of citizens**: For instance, getting into one's apartment compound or workplace requires scanning a QR code, writing down one's name and ID number, temperature and recent travel history. • **Extensive Quarantines**: In Wuhan, the authorities converted stadiums and other facilities into mass quarantine centres and built more than a dozen temporary hospitals to house patients with less severe symptoms. • **Use of Technology**: Social media platforms like WeChat and Weibo have hotlines for people to report others who may be sick. Chinese companies are, meanwhile, rolling out facial recognition technology that can detect elevated temperatures in a crowd or flag citizens not wearing a face mask. • **Moral Policing**: Some cities are offering people rewards for informing on sick neighbours. They also make a very good use of community/resident welfare workers. For instance, during complete lockdown, people who, in turns, move out of their homes for any reason had to inform the resident welfare person of his/her precise locality. This added one extra layer of public monitoring. • **Extensive testing and immediate isolation** of patients, rigorous tracking of close contacts. • **Focus on Public health infrastructure**: Construction of a hospital in 10 days and additional deployment of health workers in Wuhan to tackle the situation proactively. • **Volunteers**: The government declared a "people's war" and rolled out a "Fight On, Wuhan! Fight On, China!" campaign. It made inspirational films that combined airline ads with 1940s-

	style wartime propaganda. The ads were somewhat corny, but they rallied the public. With training, volunteers were able to do some ground-level but crucial medical tasks, such as basic nursing, lab technician work or making sure that hospital rooms were correctly decontaminated. • **Use of innovative ideas** to capture the market in a transformed economic situation. E.g. a publicly-traded real estate developer in China, called Evergrande Real Estate Group, mobilized its offline sales force and encouraged them to use VR and social media to better engage customers. **Analysis of above approach** • Critics say that often over-the-top measures – exemplified in videos circulating online of citizens being tied to a pole or publicly humiliated for violating prevention measures – can be avoided if the government acts in a more prompt and transparent manner. • However, these bold approaches have helped China in tackling the situation. Recently, no new confirmed or suspected cases have been reported in Wuhan and Hubei provinces. • It is believed that the single biggest contributing factor to China's containment of the virus has been the aggressive use of quarantines. In Wuhan, authorities converted stadiums and other facilities into mass quarantine centres and built more than a dozen temporary hospitals to house patients with less severe symptoms.
TAIWAN	• **Stopped export of surgical masks**: The Taiwan government stopped the export of surgical masks and requested local companies to step up the production of masks, i.e. for 10 million masks a day. • **Implemented purchasing policy**: The policy that permits buying only a certain amount of adult and children masks per week from pharmacies was put into place. • **Online mask**: Facility of online ordering of masks and picking them up from the government designated place at the appointed date was done to avoid a panic situation • **A unified command centre** was set up to ensure the coordination between those managing resources, holding daily briefings and those controlling public messages. • **Big data analytics** was used by the Taiwan government for developing a platform to inform the people about aspects like where masks were currently available and the whereabouts of infected people. • **Integration of travel history**: Taiwan's health insurance and immigration agencies integrated the travel history of local and foreign residents of the past 14 days along with their health insurance card data- allowing hospitals , clinics and pharmacies to access that information while dealing with the patients • **Taiwan's health system**: User data was stored in a centralised data system, accessible to hospitals and clinics, so that doctors could quickly access and view their patient's history. This proved effective in saving lives. • **Public education and awareness** was focused on widely. Thus, from above, it's clear why Taiwan has been successfully able to contain the spread of the virus.
SINGAPORE	• Singapore reported fewer than 390 cases and has had only 2 deaths which are amongst the lowest in the world. • Singapore's relatively low rate of infection came through a potent combination of **early and intensive policy interventions**, including shutting its borders. • It set up a **virus-fighting task force**, promptly imposed strict hospital and home quarantine measures, and banned large-scale gatherings. It did not stop short of shutting down schools and fully closing its borders. • **Proactive, not reactive:** Within 24 hours of a new infection, Singapore raced to stitch together a holistic picture of an infected person's movements. • **Contact Tracer Team:** It involved mobilizing a team of more than a hundred dedicated contact tracers, who worked around the clock. • Once a case was confirmed, within 2 hours, the contact tracers created a detailed activity log of

	the patients' movements and interactions in the 14 days before admission. ○ Its band of contact tracers had been so effective that approximately 40% of the people first found out that they might have been infected, only when the country's health ministry phoned up to say that they needed to be tested and isolated. ○ Aside from conducting extensive interviews with patients, contact tracers also leaned on the police to play surveillance footage from private venues or businesses that the patients may have visited, or would track them down via digital signatures left by ATM card withdrawals or credit card payments. • Singapore took a step further with its contact tracing process, rolling out a smartphone app called '**TraceTogether'**, regarding which they encouraged all the Singaporeans to download. • **Lessons learned from SARS:** After SARS and H1N1, Singapore built a robust system for tracking and containing such epidemics.
OTHER LEARNINGS	• A small town in Italy managed to stop a coronavirus outbreak in its tracks after authorities tested the whole population more than once. **The 3,300 or so citizens of Vo' Euganeo**, just 30 miles (50km) from Venice, were all swabbed for COVID-19 in late February. ○ Anyone who tested positive was immediately quarantined to stem the spread of the disease – even if they weren't showing symptoms. ○ Two weeks later, mass testing showed the infection rate had dropped by 12 times from three per cent of the population to just 0.25 per cent.

10. INDIA'S PREPAREDNESS

- **Laboratory Preparedness in India:**
  - The ICMR-National Institute of Virology (NIV), Pune functions as the resource centre for Virus Research & Diagnostic Laboratories (VRDL) network and is responsible for providing technical training for performing virological diagnosis. It is responsible for the supply of primers, PCR reagents etc. to laboratories and undertakes quality control activities.
  - The ICMR has approved a total of 118 government laboratories for testing. However, just 92 are operational for COVID19 testing and 26 are still under process for operationalisation.
  - As per ICMR's list of private laboratories to test COVID-19, there are just 16 of these, though the number of sample collection labs are higher.
- **The testing strategy** has been revised after much criticism related to our lack of testing: It would now include:
  - All asymptomatic individuals who have undertaken international travel in the last 14 days.
  - All symptomatic contacts of laboratory confirmed cases.
  - All symptomatic health care workers.
  - All hospitalized patients with Severe Acute Respiratory Illness (fever and cough and/or shortness of breath).
  - Apart from that, the asymptomatic direct and high-risk contacts of a confirmed case should be tested once between day 5 and day 14 of coming in his/her contact.
- **Can India rely on summer temperatures to thwart the COVID-19 outbreak?**
  - Some early research had revealed that **higher temperatures and humidity** could lower the rate of COVID-19's spread.
  - The major reason behind this is that warm, humid weather can make it harder for respiratory droplets to spread viruses. The droplets that carry viruses do not stay suspended in humid air as long, and the warmer temperatures lead to more rapid virus degradation
  - However, the spread of coronavirus has shown around the world, that hot and humid weather will not stop coronavirus infections entirely. E.g. Singapore, where the average temperature is around 80°F year-round, more than 500 cases of the virus have been confirmed, despite rigorous detection methods and strict quarantine rules.

11. INTERVENTIONS REQUIRED AT DIFFERENT LEVELS.

AT POLICY LEVEL	
Resource Mobilisation	• Government bonds like **COVID-19 Mitigation Bonds** can be issued. The amount invested in these bonds can be made tax exempt or taxed at a lower rate (the rate of the bonds should be indexed for inflation). • The companies should be allowed to deploy CSR funds for capacity creation to fight COVID19. • The borrowing limits of states could be increased. • The fall in prices of petrol and diesel could be utilized and the increase in excise duty on petrol and diesel channelized to create a fund specific for COVID-19. • International funds like the COVID-19 Solidarity Response Fund of WHO could be utilized • The state must encourage voluntary contribution from people and businesses. • The authorities should stop spending funds on non-urgent activities and divert these funds to buy testing kits and developing quarantine facilities.
Relaxation in rules and taxes exemptions	• Production of critical medical supplies should be exempt from any kind of tax or duty for the near future. • The rules to promote **product innovation and market exclusivity** could be relaxed**.** • **Regulatory clearances must be expedited** for both domestic and foreign firms like CoSara diagnostics to come forward and develop diagnostic kits indigenously. ○ **CoSara Diagnostics**, an India-US joint venture, became the first company in India to develop a US Food and Drug Administration (FDA)-approved Covid-19 diagnostic test that is awaiting a licence from the government to manufacture coronavirus test kits. • The GST and corporate tax payments could be deferred for a quarter or two, to provide breathing space to the many small-scale industries • GST on electronic equipment, which is needed for online delivery of services may be suspended for the time being. • The EMI payments for individuals or corporations may be deferred for a quarter or 2, or ask for the interest payments only. • As regards the banking sector, changing the definition of NPAs to provide more room for companies could really help.
Essential Supplies	• **Essential Commodities Act** should be invoked for the media as well so that ICMR advisories could be broadcasted in every home at the specified time. • **Fair Price Shops** under PDS should provide essential supplies to the poor people through the home delivery method. Volunteers or employees can be employed on a contract basis. • **Food Coupons**: SMS with unique codes can be sent to the targeted population, which they can use as food coupons. And these food coupons should be allowed to be used in any of the nearby restaurants and food outlets. The government could, later on, reimburse these restaurants. • The overflowing food stocks of the FCI could be used to meet the demand of the food grains.
Payment and Supplies	• **Direct Benefit Transfer**: Bank accounts created under Financial Inclusion programs may be utilised efficiently to support the vulnerable population. • **Livelihood assistance** must be provided for the people tested positive and the ones undergoing self- quarantine (from the BPL category/ in a targeted manner). This could encourage more people to come forward for the test and treatment. • A **temporary income transfer scheme** to help the poor survive during the coronavirus pandemic should be considered.
Share the financial load of companies	• **Denmark** is offering compensation to people who lost their jobs. Firms would be compensated if they sent them home instead. • **Italy**: The loan and mortgage payments have been suspended

	• **Malaysia**: They are giving cash handouts to the workers forced to take unpaid leaves. Their electricity bills and other utility bills are being discounted. They are making it economically comfortable for the people to stay at home**.**
Future Economic Preparedness	• Governments should use this crisis as an opportunity to launch a bold investment program for clean, green infrastructure, as envisioned in the Green New Deal. Another viral epidemic is inevitable, and the climate crisis demands much ambition and resolve. • Policymakers should be preparing for availing public-service and guaranteed-job programs to anyone who shows up at the unemployment office. • Job guarantee should be paired with training and education in order to help workers qualify for better-paid private-sector employments when the economy recovers.
Security Aspects	• Security needs to be looked after despite the healthcare, as witnessed in the recent Kabul Gurudwara attack. The critical infrastructure especially could be a potential threat area. • The security personnel must be provided with adequate healthcare kits, masks, gloves etc. to avoid the disease, and trained to maintain a minimum distance of 3 feet.
Miscellaneous	• **A token generated system for permission of movement:** In the eventuality of complete lockdown and curfew, many citizens with genuine emergency situations may not be able to access hospitals. ○ **A separate portal or hotline should be created for them and tokens valid for 24 to 48 hours for movement in the city may be generated** to help them cross barricades in times of emergency. This will not create panic and restlessness in the society in general. • **Examinations:** The interest of students has been affected due to the closure of schools, colleges, placement drives and coaching institutions. Hence there is need for certainty in terms of date of examinations, especially those conducted by CBSE, ICSE, SSC, IITs, State Public Service Commissions and Union Public Service Commissions among others. • Announce a **special 'Risk Allowance'** for doctors, nurses and health workers for a period of six months. • Begin construction of **temporary facilities with large numbers of ICUs** and ventilators in geographical areas where the outbreak is expected to be concentrated in near future. • The amount transferred under **PM-KISAN should be increased to Rs 12,000** and the balance for 2019-20 should be disbursed immediately. ○ **Tenant farmers** should be brought under the scheme and given Rs 12,000 per family. • Banks can be instructed to **lend to panchayats, municipalities and corporations** against the security of the tax receivables. • Instruct banks to **extend the date for any kind of EMI payment** until 30 June 2020.
AT ADMINISTRATION LEVEL	
Testing Capability	• **Drastically increase the number of tests** administered daily as there are often asymptomatic cases that go on to infect others and so early diagnosis is extremely important. • **Temporary Hospitals for Quarantine:** India can build Temporary hospitals for the quarantine of people showing mild symptoms. Like China, it can make use of Stadiums, build temporary hospitals to house patients with less severe symptoms. • **Perform Mass Testing:** Develop multiple teams of 2-3 people each tracking every infected person, everybody they interacted with, then everybody those people interacted with, and isolating the bunch. • **Drive-through testing method:** People can come and simply roll down their windows of their vehicles and get swabbed by medical personnel equipped with protective gear. • Set up **COVID-19 testing mobile labs**, hospitals and mobile cabins (also called 'Fangchang') like South Korea and China did.

	• **Contact Tracing:** It is the process of identification of persons who may have come into contact with an infected person ("contacts") and subsequent collection of further information about these contacts. • The governments could pass **ordinances** that enable the authorities to collect mobile phones, credit cards, and other data from those who tested positive in order to reconstruct their recent whereabouts. • This information could then be shared on social media apps that allow others to determine whether they crossed paths with an infected person. • The government should **join hands with the private sector** to increase testing capacity. • **Procurement and distribution should be decentralised**. Currently, HLL life Care limited is the central procurement authority. Mass testing facilities should be provided to the manufacturers, and the private sector at large should be incorporated in the same. • Testing facilities need to be provided **without charging money from the people**. The people going for testing may pay the fee and then upload the bill along with their Aadhar number on the Command and Control Centre website, which would then be **reimbursed** by the government, directly into their accounts. • **The Cost of testing** has been capped at rupees 4500. 60,000 tests are possible in a week.
Dedicated Covid Hospitals	• Every major city should dedicate two major 1,000-bed government hospitals and convert them into Covid hospitals with piped oxygen, suction and compressed air supply to run 1,000 ventilators. • **Restricted Hospital Visits** should be ensured for people in general, and with special focus on patients having underlying diseases such as diabetes. • If you mix Covid patients with regular patients, 40% of regular patients will get infected. • Patients who may not require advanced critical care support should be treated at the Covid hospitals. • Critically ill patients with respiratory failure should be sent to private hospitals with a modern ICU with highly skilled staff, and equipment like ECMO. • **Fever clinics could be set up,** with online consultation across the city along with guidelines on viral screening and follow-up.
Awareness and Education	• **Regular announcements** in villages, towns, and city wards about correct information regarding COVID-19 should be made to spread awareness and educate people. • Encouraging people to potentially **avoid non-essential visits** during festive season (Eg: Ugadi for Andhra Pradesh, Telangana and Karnataka, and Gudi-Padwa in Maharashtra). • **Promoting practices** like Yoga, pranayama, ensuring a healthy eating, as well as following the government's instructions regarding restrictive movement to ensure any unintended carrying of virus from one place to another. • **Myth busters** should be communicated to rid of misinformation and fake news. • **Educative and informative videos** on and about coronavirus can be aired on social media featuring celebrities, doctors, sportspersons etc.

Monitoring	• **Every district** should be treated as a separate unit to reduce the transmissibility of the virus, as some districts are more severely affected than the others.
	• **Use technology to track-** devising apps that can track the quarantined, and collect data on symptomatic suspected people.
	  ○ Develop apps and websites for sharing and collating detailed information on the spread of the disease.
	  ○ Installing CCTV cameras and tracking the movement of vulnerable citizens.
	  ○ **Developing an interactive map** showing the locations of the infected and showing the same through the news channels.
	  ○ Sending alerts to users when they get within 100 meters of these locations.
	  ○ Every **District Magistrate and Civil Surgeon** could release **videos on YouTube, Facebook** ensuring about the availability of such facilities.

	• **Absconding Patients from hospitals:** The important causes of absconding are mainly the **fear** of being quarantined and **unhygienic toilets** in government hospitals. This needs to be checked.
Essential Supplies	• Arrangement of adequate food supplies through the Food and Civil Supplies department should be made. • A **check on the black marketing of essential items** like food items, masks and sanitizers, and other products of daily use should be ensured. • **All civilian supplies** should be supervised by a civilian and not by police men. The term 'grocery' in the government directives should be defined from the perspective of 'Thela Walas' as well.
Transportation of Migrants	• The **rush of migrants** to their home towns and villages has the potential to transport the virus to the villages as well. Sufficient Government arrangements should be made to transport these people safely to their destinations or kept in guest houses in their current location.
Sanitize public facilities	• We can take cue from Istanbul, which has deployed a hygiene fleet of 40 vehicles and hundreds of personnel to sanitize and re-sanitize public and municipal facilities. • **Disinfectants** should be installed at various bus rapid transit stations. For example, Kigali (Rwanda), has installed portable hand-washing stations across the city at bus stops, taxi queues and car parks.
Regulation and Penalisation	• **Quarantine violators** should face significant fines. Anyone giving **false information** must face punitive action. • The **vehicles of those violating the lockdown** for no valid reason may be impounded till the lockdown is over. The vehicles should be released only on depositing hefty fines, which could be utilised partially for buying medical supplies and the rest of the amount should be put in the **Coronavirus Mitigation Fund**. • Steps should be taken **against the landlords** who are evicting their tenants due to the fear of Covid. Many doctors, sanitation workers, airline crew have faced eviction.
Security Aspect	• The administration should also be **ready for any criminal activities**, which may come up in the times of lockdown. These can be due to loss of jobs or just a lack of vigilance. Many criminal minds can take advantage of the situation.
LOCAL BODIES AND CIVIL SOCIETY AT LARGE	
Role of Gram Panchayat	• They should be asked to provide a list of persons who came to the villages before the lockdown was implemented. • **Community watch** can be initiated on those individuals identified. If they showed symptoms of infection, they could be isolated and treated. This step will ensure that the infection doesn't spread much in rural India, which houses 70% of the population. • A **Gram Panchayat quarantine centre** can be opened up at each and every Gram Panchayat. Migrants coming back could be quarantined for fourteen days there.
ASHA Workers and Anganwadi Centres	• We need to provide them with the **basic training and awareness of** the disease. Provide them with the **protective gears** and remunerate them handsomely to keep their motivation up. • **Anganwadi centres** can help in the distribution of the food. The anganwadi workers should be sensitised and provided with protective gears. Door to door delivery of '**Mid-Day meals**' is an important step to keep children healthy.
Philanthropists and Wealthy Families	• If anyone is **having empty farm houses** away from cities, they can contribute by providing their farmhouses as quarantine centres to the Health Authorities. The sanitization, upkeep and running cost of the facility can be borne by the government at a low cost. This would be far less costly than booking hotels for quarantine facilities. • **Wealthy households** must come together to develop a fund which can be used to fight this menace.

Move towards new forms of Social Organisation	• History knows many cases where well-known inventions were unable to achieve widespread adoption until a particular crisis necessitated their implementation. Like any epidemic, COVID-19 is a temporary phenomenon. But the arrival of an emergency, however fleeting, **can provoke changes that will remain with us for a long time**. • People could change their perceptions about their **stereotypes and social differences**. • Modern man will have to face ultramodern and pre-modern structures simultaneously.
Re- think the institution of family	• People should **re-learn how to spend time with each other**, not just during weekends, but all their free and non-free time in general. • **Discuss about values** to strengthen and express our values as individuals and as families. At both work and home, we can engage in deeper conversation about what matters the most to us. For example, becoming more honest and thankful about the blessings that we have received thus far. • **Stay connected**: Social distancing does not require us to fully abandon our sense of community and support. Working parents who are fortunate enough to be able to work from home should make the most of this time.
Miscellaneous	• **RWAs should gather information on people returning from abroad** recently and report it to the police. Persons with such travel history, even if asymptomatic should get themselves tested **through private labs (as they can afford it).** If the traveller is tested positive, his family members should be tested and quarantined. RWAs can play a major role in monitoring their movement. This will ensure a reduced burden on the government. • NGOs and welfare organizations already engaged in rural and backward areas should be instructed to spread accurate information on COVID-19.
CITIZENS AT LARGE	
Personal Hygiene	• **Frequent sanitisation** must be done at the places which are most visited like grocery shops, medical centres etc. • It is important that the citizens **practice respiratory etiquette** (For example, by coughing into a flexed elbow). • There should be a special focus on **creating homemade sanitizers** and the regular disinfection of fridge handles, door handles, door knobs etc. and regular cleaning. • **Appreciate each other** and talk with everyone. Ask them about their health and family. • Follow the **government's to do list** issued for the citizens. A lot of infections can be controlled just by this simple routine practice.
Awareness Generation	• As citizens, we all need to have a general interest in our own health and this interest should come in the form of informed opinion based on scientific data and sources. • Citizens must **not hoard things**, waste food and other essential items. Citizens must cooperate with the administration and follow their instructions for everyone's safety. They must practice self-isolation, take regular baths and be positive. • **Stay Connected:** Make phone or video calls with family and friends. • **Volunteers from NCC, NSS** should be put on alert in case the civil administration faces a shortage of manpower.
Think and Innovate	• Of course these are challenging times. But they also provide an opportunity to be creative about how we meet our varied demands. • Our old habits and routines may not work in this situation. So, try something different.
Family Time	• Japan has been a good example in this regard: How socio cultural norms of personal hygiene have been effective in controlling the spread without disturbing normal life much. • There should be a specific focus on preventing intermingling of young ones with their grandparents.

MEDICAL PROFESSIONALS	
Record Keeping	• The spread of diseases should be adequately recorded by updating data from time to time from both the public and the private sector. This is essential to plan the health strategy for a particular region. • For instance, the spread of Corona is similar to most influenza type viruses which have air borne transmission. In order to prepare a strategy for a new type of disease adequate precedent in the form records can come very handy. • **Scientists and Pathologists:** A portal to share information and genomics sequence which is open to all can be done. Since the virus is new, a concerted effort from all national and international scientists is required to share this information.
Strengthening the Investigative Section Of Medical Services	• The health services are deficient in investigative equipment- from basic pathological kits to technology equipment like MRI, Ultrasound machines etc. For corona testing we are dependent on private labs, which are needlessly charging heavily. • The large number of our research institutions should be able to provide affordable alternatives

Research and Development	• The COVID-19 strain prevalent in India should be compared against the virulent strains outside India. There is a need for an early international collaboration to understand the disease pattern.
	• **Drug Combination:** Combination of three to four varieties of drugs targeting Coronavirus at different stages in its life cycle could arrest the infection and lead to cure.
	  ○ First, the entry to human host cells could be blocked by **hydroxychloroquine** working at the endosomal level.
	  ○ If that doesn't stop the virus' entry to the host cell, then the 2nd class of drugs like **lopinavir/ritonavir** that are protease inhibitors can block viral replication in addition to RNA synthesis inhibitors like **Remdesivir** (patent of Gilead can be looked into).
	  ○ The 4th drug could be inhibitors (like camostat mesylate) to our cell receptors, **ACE2/TMPRSS2**.
	• Researchers at the University of Texas at Austin and the National Institutes of Health, U.S., have produced a **3D atomic scale map** of the protein of the SARS-CoV-2 that binds to and infects human cells.
	  ○ Knowing the structure of the spike protein will, in turn, allow scientists to develop vaccines and antivirals against the virus and even better diagnostics.
	• Pune-based National Institute of Virology has **sequenced the SARS-CoV-2 genome** collected from two patients in Kerala. The government must ensure that such institutes are provided with proper funds and latest equipment to expedite the research.
	• Researchers at the Indian Institute of Technology, Delhi have developed a method to detect COVID-19 which can significantly reduce the test cost, making it affordable for large sections. The National Institute of Virology (NIV), Pune is in the process of validating this test on clinical samples.

Respiratory Interventions	• COVID-19 is causing harm to the respiratory tract. Thus, there is a need for the early intervention in the form of setting up a panel of renowned pulmonologists and physicians to enlist the absolutely needed medications to ease respiratory symptoms (shortness of breath, asphyxia etc.) • All kits required for collection (Respiratory samples like Nasopharyngeal Swab, Sputum and bronchoalveolar lavage) such as swabs, VTMs, Zip Lock Bag & Cold Chain etc. should be made available. • All lab investigations of a COVID-19 suspect case should be kept confidential till such time as the results of the COVID-19 tests are made available.

	• A Microbiologist should be posted for supervising the sample collections from the patients in a proper way and ensuring the transportation of samples to designated laboratories for testing under appropriate conditions, including maintenance of cold chains for this purpose. • After confirmation, proper bio safety precautions should be observed if any invasive investigations are done.
One Health Policy Concept	• India can become the world leader in propagating the 'One Health Policy Concept'. • As human populations expand, it results in greater contact with domestic and wild animals, providing more opportunities for diseases to pass from one to the other. • A stellar example of the OneHealth concept being operationalised was seen in India in the late 1950s. It helped discover the source of the Kyasanur Forest Disease (KFD), a highly dangerous hemorrhagic fever, more threatening than COVID-19. It was locally called 'monkey fever' because of the links between monkey deaths and human infections in Shimoga District of Karnataka where it emerged in 1957.
Other Interventions	• The Health Ministry should create two teams of doctors, one for **screening and triage**, and another ICU team to manage **critical care service**. • **Covid ICU simulation** should be set up at large hospitals to teach staff on safe practices. • **Postgraduate medical students** should be given the option to work in the Covid ICU as a part of their training program. PG students, interns and final year medical students should be posted in the respective hospitals' ICU to familiarise them with ventilated patients. • The National Medical Council should **allow young doctors trained** in recognized overseas medical colleges a temporary license to work under senior doctors. • Medical Council of India should permit **online consultation and e-prescriptions** to manage Covid patient data from home and maintain medical records. • Indian Nursing Council should permit **final year nursing students** to take care of stable ICU patients. • Develop **Health QR codes** for everyone. For example, the green code allows one to move freely. The yellow code requires a seven-day self-quarantine. The red code requires a 14-day self-quarantine.
TECHNOCRATS	
Use of Big Data	• China had used big data analysis and massive surveillance capabilities to tackle the virus. China published the travel details of the first patient online and contacted the possible infected persons to come and get tested. All this was done with the help of surveillance capabilities. • South Korea did the same. These kinds of measures could face criticism for violating the right to privacy, but India must use whatever big data capability it has to trace the travel history of the suspected patient and make it online and trace the possible carriers. Public benefit is greater than the harm in this case
3D Printing	• It can be used to boost supplies. Experts say that 3D printers could help produce other medical supplies as supply chains worldwide are disrupted by the coronavirus.
CORPORATES	
Work at developing health equipment	• These include masks, oxygen cylinders, negative-pressure isolation rooms etc. • For example, Johnson & Johnson has donated a million surgical masks to Chinese health workers. • IKEA is helping to kit-out hospitals in affected areas. • **Commercial Testing Kits** on the lines of nucleic acid testing kits, developed by South Korea could be developed based on the genetic profile of Indian citizens. • Singapore deployed a new test to track links between infected patients, which helps the authorities to stop the virus spread.

	• A serology test, a blood test can be used to look for antibodies in blood that are a sign of previous infection.
Protect the employees	• Responsible firms should do everything possible to protect their people and employees. These companies will build more resilient and more loyal workforces, better positioned to weather a prolonged economic storm. • Microsoft has agreed to keep paying regular wages to the hourly workers who support their campus, even if hours reduce. • UK supermarket Morrisons launched a hardship fund for employees facing difficulties. • **Develop good communication with employees**- When the boss speaks, people listen – and the tone, accuracy and relevance of the employers' advice can make all the difference between a calm and panic.
Develop Smart Working practices	• Companies should promote enhancement in productivity of smart-workers, measured by various indicators. • As per some experiments, smart-workers used 5 less days of leave in 9 months compared to workers who had not been granted flexibility. Compliance with deadlines was 4% higher for smart-workers. Smart-workers were 5% more satisfied with their life and 8% more satisfied with their social life. • The current coronavirus emergency has driven companies to grant smart-working for a wide range of jobs, thus revealing that it is feasible both for routine and for non-routine tasks.
Redeploy some employees towards social needs	• Protecting employees and redeploying their unique capabilities to meet the society's immediate needs could build more loyal workforces and public goodwill while helping to fight the global crisis. • Reliance Industries Limited readied India's first 100-bedded facility at one of its hospitals in Mumbai for patients who tested positive for COVID-19. • The Mahindra Foundation will create a fund to assist the hardest hit in our value chain small businesses and the self-employed
Prepare for future costs	• The longer the quarantine and the need for isolation, the more habitual (but still not widely accepted) methods of organisation will become a habit. • The worse the impact of the crisis on the economy, the more the business will be forced to cut costs. • Costs for expensive offices and work infrastructure is a primary concern.
Use of technology	• **New Drone Boxes Can Be Used for Transporting Swabs and Medicine-** as done by the Italian company Elite Consulting. ○ The drone can be equipped with two boxes and is also able to fly during light rains to ensure continuity of operations. ○ Due to the resistance of the box, in the event of an accident, it is ensured that the biological material does not come in contact with the surrounding environment. ○ If an old person needs urgent medicine, we can reach him within two minutes and deliver the medicines to him. ○ It can then land and provide instructions to the person by phone on how to get it out of the box.
Learnings from other companies	• Big companies in the US such as Microsoft, Amazon etc. collaborated to create a COVID-19 Response Fund, targeting the hard-hit Washington State. • Alibaba foundation is donating 1.1 million testing kits, 6 million masks, and 60,000 protective suits and face shields. They are all being sent to Ethiopia first, from where they will be sent out to every other country in Africa. • In the UK, the government turned to some of the country's biggest industrial names, including Rolls Royce and the electronics manufacturer Dyson. They have been called upon to start producing life-saving ventilators

	• French luxury brand house LVMH, which owns Louis Vuitton, Bulgari, TAG Heuer, Tiffany, Dom Pérignon and many other high-end brands, started manufacturing hand-sanitizers to fight COVID-19. • The NHS in the UK struck a major deal with the private sector to help fight nCoronavirus with 20,000 more staff, 8,000 hospital beds and some 1,200 ventilators being made available, to help fight the pandemic, following a surge in cases. • **Diageo India** has pledged to produce around 3,00,000 litres of bulk hand sanitisers across 15 of its manufacturing **units in the country to help cope with the demand for the product.**
ENTREPRENEURS	
Develop equipment at mass scale	• IIT Delhi researchers have developed affordable tests for diagnosis. These need to be accredited after which private pharmaceutical companies need to be roped in to indigenously produce such kits within the country on a large scale. • India is acutely short of **ventilators**. No other country is allowing export of ventilators. Government must support local companies to manufacture ventilators on a war footing**.**
Develop Technologies	• Online data platforms can be used to predict the future by combining local infections and population moves, and therefore optimize the allocation of public resources. • AI technologies can be integrated with infrared imaging for rapid and multiple body temperature monitoring. This technology can quickly screen crowds to improve detection efficiency and reach an accuracy rate of over 90%, which also prevents virus transmission.
Opportunity for Change	For entrepreneurs, coronavirus present the following opportunities and insights: • Digitalization is the future • Risk management needs to be re-evaluated

12. HOW CAN INDIA PREPARE FOR POST-COVID SCENARIO?

Workplace for the Future	• **Gig Economy-** Freelancing and work from home would become the norm of the day for businesses, as new ways of working would be adopted in the coming months.
	  ○ But not every business has the same amount of experience, comfort or access. To address this, we need to **level the playing field**.
	  ○ Even among those with this experience, it has typically been either by choice or design. The new realities demand coping strategies on **how to structure our work as well as manage our own needs** and expectations.
	  ○ While many of our organisations have created policies and practices to support virtual work, they do not meet the scale, scope and speed we are now facing. We need to think holistically about what we need from our social networks.
	• **Investing in tech tools-**
	  ○ Get as reliable a source of audio as possible**.** If you have more resources, add videos for a richer and more socially connected experience.
	  ○ Developing shared virtual workspace and collaborative file-sharing are always helpful.
	  ○ Infrastructure to maintain the **confidentiality of work**
	• **Building mutual understanding-** One great technique is to give a virtual tour of your environment. e.g. Turn the camera around, show your home office and share any likely interruptions such as children, curious pets or joint spousal workspaces. This is often a good way to bond with your co-workers who are wrestling with the very same challenges.
	• **New set of labour laws** would be required for the changed working circumstances.
	• **Dual-career couples-** Both partners are highly educated, work full-time in demanding professional or managerial jobs, and see themselves on an upward path in their roles.
	• **New Set of Skills-**
	  ○ **Multi-tasking**- The organisations have to start developing an appetite among their employees for this to stay competitive.

	○ **Having scheduled calls** to maintain accountability ○ **Brainstorm on holistic solutions for all likely disruptions-** Businesses should conduct drills for such scenarios. E.g. mandate that every employee 'work from home' at least two days a month (subject to certain exceptions). Such drill will ensure that both the employees and the technology infrastructure is ready in case of emergencies.
Establish new supply chain	With the global supply chains set to shift from China, India can fill this vacuum and become a new **manufacturing hub** for the world in future. The following sectors need special emphasis in this case- • **Mobile and Electronic Manufacturing-** New manufacturing policy for electronics goods and plans to encourage manufacturers of mobile phones semiconductors seeks to support development of EV ecosystem and supply chain. ○ The COVID-19 provides an apt opportunity to setup the supply chain in India • **Active Pharmaceutical Ingredients-** The corona crisis shut down the API supply chain from China, which meets over 60 per cent of India's needs. ○ Apart from APIs, we also need the public sector for using the compulsory licence route to produce life-saving but patent-restricted drugs, if the need arises. ○ The need to protect and promote domestic pharmaceutical security goes beyond COVID-19.
Formal Economy	• While businesses across sectors are finding it a challenge to stay up and running, it has been a particularly distressing time for small businesses and SMEs who gloomily stare at an uncertain future. • India can look to formalize the large **informal sector** present in India towards **future jobs.** ○ The government can use this opportunity to work closely with the Reserve Bank of India (RBI) to ensure that the necessary fiscal stimulus is supported by further loosening of monetary policy. ○ RBI should target certain sectors like **pharma, auto, construction, tourism**, etc — for further regulatory forbearance to reduce cost of doing business. These could be time-bound actions for 3-6 months. ○ More **funding for MSMEs** could also be considered by increasing assets of Mudra Bank and other MSME-focused banks. ○ Consider depositing cash on a monthly basis for the foreseeable future, with over 150 million beneficiaries with accounts in urban bank branches, such a transfer can reach a large segment of this population.
Technology Revolution in key sectors	• **Broadband Connectivity-** The success of programs like Bharat Net becomes way more crucial in such emergencies. More people working from home will further test the capacity of broadband networks. • **Judiciary-** E-filing and video conferencing should be available to litigants at all levels. The non-functioning of the judiciary at such times becomes a menace in itself. • **Education-** Use of portals and applications like **DIKSHA** has to be widely spread as future investment towards addressing the other problems in our education system. • **Digital payment architecture-** Banks have cut back staff in their branches and encouraged people to opt for digital payments and online banking services. ○ This is likely to push fence-sitters who somehow survived demonetisation without making the switch to adopt it this time • **Digital Currency-** Now, India should prepare to regulate such cryptocurrencies, which might become the order of the day.
Healthcare	• **Primary Healthcare System-** Setup primary healthcare cadres on the lines of Tamil Nadu and Odisha. Every district hospital should be equipped to provide critical care. ○ This is a good time for investing in **good surveillance systems** and building local capabilities that can be deployed relatively quickly are imperative. • **Universal Health Coverage-** Countries with UHC respond with efficiency and equity to health emergencies. e.g. South Korea restricted COVID-19 mortality to less than 1 per cent.

	• **Establishing a Government Centre for Disease Control -** in every district which is staffed and facilitated to test, identify and provide alerts and advice precautionary measures for pathogenic attacks like the current Covid-19 pandemic. • **Create a virus repository with genomic data:** This will be tremendously useful in developing diagnostics and vaccines for these diseases, thus helping to control them early and stopping their spread. • **Develop drugs for the future-** we need to think about creating new sources of supply of diagnostic tools and medical countermeasures including antiviral agents and vaccines**.** ○ There is a need to move away from the current "**one bug, one drug**" product development and manufacturing approach to a combo or platform one whenever science allows.

Water Management in India	Special attention is required on supply and management of essential goods like water.
	• **Water Use-** Due to increased awareness, people are washing their hands about 5-7 times a day and disinfecting their houses at least once in 2-3 days. Due to this, average water consumption has increased nearly 1.5 times.
	• **Water and Virus-** According to WHO, Covid-19 is "not robust"-it's less stable in the environment and more susceptible to oxidants such as chlorine. Conventional, centralised water-treatment methods that use filtration and disinfection could inactivate this virus. However, Covid-19 may be transmitted through the faecal-oral route. Thus, manual handling of faeces, which is unfortunately still practised in India, has to be strictly prohibited.
	• **Water Contamination-** Wastewater from medical facilities needs to be monitored and only disposed of in drains connected to a septic system or sewer or soak pits. The state of the environment must be monitored closely, to avoid any eventual secondary disaster, and potential impact assessments should be made timely.
	• **Other Steps-** India is **already facing water scarcity,** needs to conserve traditional water bodies, make water supply leak-proof and ensure 100% metering in at least urban areas.
	• **Success Stories-**
	  ○ **Seoul Water System** monitors water quality in real-time 24 hours a day, from source to faucet.
	  ○ Wuhan was declared one of China's first 16 "**sponge cities**". The ample water provided from surface and ground sources (which was meeting all potable quality standards) made it easy for the citizens to wash their hands, maintain hygiene in homes, streets, markets and in the city.

Waste Management	• **Medical Waste-** After the outbreak of the disease in China, Wuhan city doubled its capacity to handle medical waste to over 100 tonne per day and the whole province of Hubei now can handle around 370 tonnes of medical waste a day. • In India, where waste-handling methods are still in a nascent stage, we have to gear up for this new kind of waste handling.
Multilateralism	• In a world riven by virulent nationalism and tariff wars, coronavirus has turned out to be an unlikely tool that is restoring faith in multilateralism. • Covid-19 has clearly shown that the nations have to work together if they have to overcome the pandemic**.** • This might be a precursor to the **new wave of globalisation**. Probably 2020 is the watermark year in which the **G7**, the seven most advanced traditional industrial economies of the world, is overtaken by the **E7** of China, India, Brazil, Russia, Indonesia, Mexico and Turkey • India must be prepared for this new wave and **set the rules of engagement and capacity for it.** • **In designing policy,** it is important to realise that all interventions to contain the pandemic have economic implications**.**