

Global Governance of Technology, Institutional Architecture and Indian Response to COVID-19

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of Corona virus and WHO declared it as a pandemic, scientific fraternity across the world started working on the genetic make-up of the virus.

The debates are back on the role of science and technology in relation to global security and safety. While there is no denying the fact that 'WHO declared pandemics' should not invoke biosecurity concerns, the current crisis has triggered global outrage on the origin of the virus and the need for governance of biosecurity. In this brief commentary, we first take an overview of

The origin and evolution of Corona virus is under intense debate at this point. Highly conflicting and polarising evidences, inferences and commentaries have appeared in scientific journals and across popular publications. There are also debates and discussions on whether it is a man-made virus or a naturally occurring one. When China reported about the spread

prevailing global frameworks and then view the STI imperatives of COVID-19 in the Indian context and the last section suggests the way forward.

The International Framework

The prevailing debates have thrown up deeper policy insights as ethical and socio-economic

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issues are yet to be comprehensively addressed in the emerging frameworks for global governance of technology. Rise of technologies like information and communication technology, nanotechnology, new material sciences, biotechnology, including the synthetic biology, are spheres where convergence, multiplication, application of artificial intelligence and use of cyber tools with ability to scale up have created new opportunities for social and economic development and new challenges for governance.

After the launch of Technology Facilitation Mechanism (as part of Agenda 2030) and launching of STI for SDGs at the Osaka G-20 Summit, while the world is looking at making technologies work for access, equity and inclusion (AEI), the other frontiers of governance are posing increasing threats to mankind and our civilization. Although nuclear and space technologies are areas where governance mechanisms have responded well, biosecurity has yet to receive due attention. Since the adoption of the Biological Weapons Convention (BWC) in 1975, adequate institutional and governance mechanisms for security and disarmament could not come up. Its linkage with other arms of the UN, like the WHO, has also left a lot to be desired. It is essential to address such matters *a priori*, instead of reacting in retrospect.

This year, the Biological Weapons Convention (BWC) is celebrating its 45th anniversary and the

U N Secretary General made a very significant observation when he said, “Scientific advances are reducing technical barriers which earlier limited the potential of biological weapons...I therefore call on States, parties to urgently update the mechanisms within the Convention for reviewing advances in science and technology and to work together to improve biosecurity and bio-preparedness so that all countries are equipped to prevent and respond to the possible use of biological weapons. The Convention’s Ninth Review Conference in 2021 is an opportunity to address these and other issues.”

India has been consistently raising the issue of STI and disarmament for last several years at various meetings. In its statement on 26th March 2020, India suggested strengthening of the institutional architecture for greater effectiveness of the BWC. India again raised the issue of role of science and technology in the context of international security and disarmament.¹ This was actually building further on India’s proposal of 2017 when, along with 18 other countries, it had proposed the need to explore challenges and concern areas related to the use of such technologies for military purposes. The proposal had also raised the issue of potential application of such technologies for enhancing assurance levels and confidence building as well as lowering



the costs of disarmament verification and arms control.

In these discussions at the BWC, views from India corresponded with the global South to a great extent. Several developing countries backed India. At the March 2020 event, US reaction was very sharp when Senator Chris Ford, Assistant Secretary, US State Department Bureau of International Security and Nonproliferation (ISN), tweeted, "We observe the 45th anniversary of the Biological Weapons Convention and reaffirm the importance of BWC Parties' commitments to preventing biological weapons. The Covid-19 pandemic highlights the importance of BWC Parties' commitments to reducing all biological risks." In such a polarising scenario, the future course of action would not be easy. India, however, would have to build national defence system and make clear policy choices.

Indian STI Strategy

The success of India's fight against COVID-19 would be an upshot of a multiple sectoral coordination among different agencies of health, technology and diplomacy. They played an extremely coherent role in supplementing sectoral efforts. The Indian Council of Medical Research (ICMR); National Institute of Virology (NIV), Pune; Department of Biotechnology and its affiliated institutions; and Council for Scientific and Industrial Research (CSIR) played the frontline role with coordination from the Ministry of Health and Family Welfare, Ministry of External Affairs and Ministry of Home Affairs with overall guidance of the PMO, the Office of the Principal Scientific Advisor (PSA), and NITI Aayog. The Indian Mission in Beijing also played a key connect in the whole exercise.

Though SARS, Nipah virus and Swine Flu had given India some preparedness at grass root level, This was the first test case of the national agencies for not only coordinating their own action but also factoring in the grass root agencies, State governments and private diagnostics entities.

The success is also tangible at the local level where technology is leveraged and, in several cases, with utmost satisfaction. In order to meet the basic reference framework - Test, Track, Isolate and Quarantine (TTIQ), the local administration

and police relied on GPS, mining of mobile phones and surveillance footage from drones and various public places.

Salient Features

Needless to say, this mega exercise had limitations in terms of diagnostic kits (as India does not produce probes) and sufficient quantity of Personal Protection Equipment (PPE). However, there are some very important outcomes of this strategy, which increased the possibility of success. The policy decisions are being fully guided by the subject experts and leaders in the health sector. Economic and political factors were just kept aside. As the nation awaits the probable exit from the lockdown, there are four important outcomes for STI policy as discussed below:



Scientific Advice to Guide Policy Decisions

Even though the PM engaged himself with the national strategy and evolution of the response architecture, at no stage health professionals and their scientific roadmap was undermined. With the Health Minister himself being a medical professional, coordination seemed flawless. The Office of the Principal Scientific Advisor (PSA) has emerged as an important link across institutions. In addition, other national scientific agencies and WHO also worked in close cooperation with the government. The Indian Council for Medical Research (ICMR), National Virology Institute and CSIR also provided their inputs. The ICMR

remained the national lead agency for supporting the inputs on COVID-19.

Institutional Dynamism

The Institute for Stem Cell Science & Regenerative Medicine (ISCSRM), an autonomous research body dedicated to collaborative research in stem cell and regenerative biology and supported by the Department of Biotechnology (DBT), came up with a proprietary germicidal-molecule that can be covalently attached to the cotton fabric (any type including household cotton). This fabric can be stitched into PPE such as a face mask. This novel germicidal molecule can be used on clothes and fabric of any kind to deactivate various infectious microbes. With the support of DBT, another institute, viz. Rajiv Gandhi Centre for Biotechnology (RGCB), Thiruvananthapuram, is in the final stages of developing a kit that promises to help detect SARS CoVID-19 infection. The interesting part is that the detection can happen as early as within four days of infection. This institute has also validated testing protocols for diagnosis of COVID-19 along with developing the standard operating practices for the testing process and transmission of results through a cloud based platform.

With proactive efforts, CSIR identified five broad verticals to its work programme. The first was to develop surveillance and that too backed by digital methods so that the labs get a chance to understand genetic basis. The second step focussed on developing cost effective diagnostic kits. Third was to develop new therapies including the development of vaccines, the fourth was to develop hospital assistance devices and the fifth related to the development of supply chain and logistics.

Strength of Start-ups

If any of the earlier programme, that has helped in these testing times, it is the scheme of Start-up India. Several of the firms that came up under this

programme are now trying to come up with desired products. With an initial support and policy push to Start-up culture, results are becoming evident very swiftly. Biodesign Innovation Labs developed an affordable and accessible respiratory support device. Biodesign is a Bengaluru based medical device and healthcare technology company which has received funding and support from BIRAC, Government of Karnataka. This is supplemented by DST's Promoting and Accelerating Young and Aspiring technology entrepreneurs (PRAYAS), an initiative from DST to support initial gap funding.

STI and International Cooperation

India is Member of a working group established between high level officials such as Ministers and Chief Scientific Advisers from the following countries: Australia, Brazil, Canada, Germany, Japan, New Zealand, South Korea, Singapore, United Kingdom, Spain, Portugal and USA. The objective of this working group is to share research results and information on how science can assist in the decisions and measures that governments are taking to face the Corona virus that causes COVID-19. Prime Minister

Narendra Modi and his Swedish counterpart Stefan Lofven agreed on the possibility of collaboration and data sharing between researchers and scientists of the two countries, a move which would contribute to the global efforts against COVID-19. Apart from initiating a \$10 million SAARC Fund, India also hosted SAARC e-ITEC network training programme on COVID-19 management for healthcare professionals. More than 150 SAARC participants joined the course that began on 17th April, 2020.

Role of Private Sector

Some of the actors in the private sector have quickly responded to several challenges that India was facing in terms of short supplies of



gears and medical instruments. Some of the public sector institutes have extended the much needed support. The Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad developed and transferred the process for the preparation of alcohol-based hand sanitising gel to a Rajasthan based MSME on 19th of March on non-exclusive basis. Similarly, the National Chemical Laboratory (CSIR-NCL), and 12 other CSIR labs emerged with hand sanitiser solutions. The CSIR-National Environmental Engineering Research Institute (CSIR-NEERI) contributed for PPE. In addition, fifteen of the specialised CSIR institutes across India have joined local governments in COVID testing.



Pandemic vaccine development is an area of core focus for the Hyderabad-based Bharat Biotech. It had earlier contributed vaccines for H1N1, Zika and *Chikun gunya* and has now announced partnership with the University of Wisconsin Madison and a US-based company FluGen to develop a vaccine, Coro-Flu, to battle against COVID-19. Bharat Biotech has around 16 vaccines in its portfolio.

Another interesting case is of Molbio Diagnostics, established in 2000, which emerged as a leading diagnostics company. It has partnered with Tata Trusts to roll out the COVID-testing kit at a reasonable price of Rs. 1,350. It has been working on diseases including tuberculosis and malaria. The test is called the TrueNAT Beta CoV

test and has been approved by ICMR with due biosafety measures.

ICMR has certified performance evaluation of 31 commercial kits for detection of SARS-CoV-2 RNA by Real Time PCR. Most of these kits have been provided by private companies. Out of 14 firms, around 9 firms are within India and 5 from outside.

Way Forward: What Lessons?

From the science policy perspective, there are certain lessons that we may learn for evolving a long-term perspective.

First and foremost is to realise that the science agencies working on the biological part of the pandemic came together and delivered what we all have witnessed. However, a biosecurity framework with teeth is urgently required at an international level. Debates on how to tighten verification and control in this field are unlikely to move in any direction. Among the existing institutional architecture within the country, our weakest link is of biological sciences. The trinity of space, nuclear and defence R&D have had lot of attention since the Seventies. We must create an agile framework to cover the whole chain of public-health interventions - from scientific research and early warning to policy formulation, implementation, and evaluation. Bioscience expertise and knowledge networks should be urgently evolved in light of our national preparedness for biological warfare and STI would be a crucial component.

It is pertinent to institutionalise this national experience to create a National Authority on Biosecurity and Biological Emergencies (NABBE). This would not only lead but also coordinate by encouraging institutions to work together in well-defined supplementing roles, based on expertise and to not compete with each other and protect illusive turfs. With seamless coordination one can avoid loss of time in unnecessary approvals and egoist coordination. The NABBE would need to work closely with the NDMA, NSCS and other agencies including Defence, Home, Agriculture, Finance, etc.

The NABBE would help in keeping the country ever prepared for such pandemics in the future. At this stage, national preparedness requires

expertise from biological security perspective with due inputs coming from tracking of global developments in this area. The additional role that the NABBE may play is to consistently follow up for the formation of a global framework acceptable to all for wider and effective participation. Here Biological Weapons Convention (BWC) would play an important role.

In this respect we can also learn from the experiences of other countries, for instance, Denmark has established a Centre for Biosecurity and Biopreparedness (CBB) by an Act of the Danish parliament in pursuance of United Nations Security Council Resolution 1540.² The CBB is the national authority that follows biological research and products with dual use components. The Centre maintains a 24/7 vigil for possible response to any biological incident whether of accidental or malicious origins.

Secondly, developing countries like India have major institutional challenges that range from low budgetary allocation to low level of intra-agency coordination, intense fights for turfs and almost no effort to engage with other actors. India's response to COVID 19 from the STI perspective is extremely unique from all possible stand-points. The role of STI has certainly emerged as an important facet. As we move forward, this would have to be duly addressed for enhancing institutional efficiency.

Thirdly, now that some leading groups are on the EU supported Covid Moonshot project for crowd sourcing of ideas, India would have to step up cooperation across labs and national programmes. In this respect, Prime Minister's call to the young Indian scientists to deliver is very timely. In this regard the recently constituted high-level task force with the main objective of speeding up national and international efforts towards vaccine development to treat Covid. The

Task Force would be headed by the PSA and NITI and would also include representatives of AYUSH ministry, ICMR, department of biotechnology, drug controller general of India among others.

Fourth, India's efforts to evolve robust STI response would have greater strength if India continues to support global STI efforts that have assumed much greater significance in situations like pandemics, where borders just don't matter. In this regard, pragmatic R&D linkage with WHO may be further explored. With several polarising views about the organisation, it cannot be missed that the WHO released around 50 technical documents and mobilised around 2 million protective equipment to 133 countries.

Endnotes

- ¹ This issue was first added to the agenda of the First Committee in 1988, with India as the main sponsor. In introducing a draft resolution, the delegate recalled that increasing amounts of resources were being devoted to developing new weapon systems, which caused uncertainty and insecurity. Developments such as the graduated use of nuclear explosive power, miniaturisation and large-scale computing capabilities using micro-electronics, and fuel and laser technology were transforming the security environment.
- ² <https://www.biosecurity.dk/biopreparedness/>

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