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(Continued on outside back cover)

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REPORT

SYNTHESES

Science Diplomacy Events

EDITORIAL

This issue of *Science Diplomacy Review* comes amidst the challenges and opportunities arising from the COVID-19 pandemic. There is growing realisation that the pandemic is much more complex than initially foreseen. Drastic lockdown as a public healthcare measure to slow down the spread of the virus bought some valuable time, but the restrictions halted most economic activities, which severely damaged the economies of the affected countries. The initial challenges faced by the healthcare systems have been met with determination, social solidarity, and international cooperation on a large scale. But the battle is still raging, as the number of COVID-19 cases continue to mount, spreading across Latin America, resurfacing in Asia, and increasing threat of its unknown scope in Africa. International science cooperation enables scientists across the globe searching for diagnostics, therapeutics and vaccines to understand and fight COVID-19 together. Experience of this pandemic will make humanity better prepared to deal with similar outbreaks in the future.

This SDR issue also offers a rich content and covers interesting themes related to science diplomacy. The focus on COVID-19 is appropriately reflected. The articles highlight Indonesia, Africa and India's response to the pandemic, and their efforts in forging international collaborations in tackling COVID-19. The role of Science, Technology and Innovation (STI) institutions in supporting foreign policy is analysed by Hardi Alunaza et al. The article also examines Indonesia's science diplomacy initiatives in mitigating the COVID-19 outbreak. The article by T. C. James assesses the Indian healthcare system and its response to the pandemic, as well as India's contribution to the international response to COVID-19.

In the perspectives section, Pranay Verma, Ambassador of India to Vietnam focuses on strengthening India-Vietnam Science and Technology (S&T) cooperation in diverse sectors. The S&T cooperation should aim to promote innovation and enhance capabilities of the local enterprises, to enable them to become a part of the global value chains. India's response to COVID-19 and its science diplomacy initiatives have been extensively explored in the perspective by Jyoti Sharma and Sanjeev Kumar Varshney. They delve into India's international collaborations and its efforts to connect the Indian scientific community with researchers from other countries to work together for solution-oriented research on COVID-19. The US withdrawal from the World Health Organization (WHO), to take effect from July 2021 poses a great challenge to the international community at a time when the WHO's coordinating role is extremely important. The current challenges facing WHO in the wake of the pandemic are outlined by Bhaskar Balakrishnan. The article by Bompongo Nkombe Adolin provides an African perspective on the COVID-19 pandemic.

In this issue we have introduced a new section focusing on institutions in science diplomacy. As institutions are acquiring increasing visibility and relevance in taking science diplomacy forward, the activities of the Science Diplomacy Centre at the Fletcher School of Law and Diplomacy are reviewed. The review article 'Science Diplomacy, Technology and International Relations' reviews three extremely interesting and significant books on science diplomacy, which are crucial for conceptual understanding and in outlining policy-oriented discussions on global science diplomacy. The issue also reviews the policy report on European Union's science diplomacy and global challenges published by the Horizon 2020 funded project - Using Science For/In Diplomacy for Addressing Global Challenges (S4D4C).

The last section of the issue provides syntheses of three webinars organised recently. First on India-Japan STI partnership for SDGs; second on a Global Pilot Programme for STI for SDGs roadmaps; and third on India-Vietnam cooperation in STI. The section also covers the recently held virtual Warsaw Science Diplomacy School organised by the EU's Horizon 2020 funded project - Inventing a shared Science Diplomacy for Europe (InsSciDE).

We have tried to bring together interesting and thought-provoking articles covering diverse aspects of science and diplomacy in this issue. We look forward to further strengthening this platform for fostering science diplomacy dialogue and research. In such critical times, I wish all the readers a safe and healthy life, with the hope to overcome the pandemic outbreak.

ARTICLE

The Role of STI Institutions and International Cooperation in Mitigating COVID-19 Outbreak in Indonesia

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Introduction

The world is currently affected by the Coronavirus outbreak and the World Health Organization (WHO) identified COVID-19 (Coronavirus Disease 2019) as a global pandemic on March 11, 2020 (Djalante et al., 2020). Beginning at the end of December 2019, the COVID-19 outbreak in China's Wuhan province quickly spread around the world. COVID-19 spread across 113 countries with United States, Iran, South Korea, Spain, Italy, Indonesia being the worst affected (Xie & Chen, 2020). Not only developing, even developed countries have suffered due to their insufficient capacity in the field of hospitals, medical equipment, and have not been able to find a vaccine for COVID-19 (Situmorang, 2020). In the era of globalisation, the movement of people across regions has led to the spread of virus rapidly. The COVID-19 has posed a major threat to global health as it not only resulted in thousands of deaths but also has a major impact on trade, employment, and domestic economies of affected countries (Lora, 2020; Pradanti, 2018).

As of July 13, 2020, as many as 74,018 patients were tested positive in Indonesia. The Indonesian government has confirmed that the transmission is still taking place and that the number of coronavirus affected patients

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would continue to increase (Liputan, 2020). The current COVID-19 death toll in Indonesia has risen to 3535 by July 13, 2020. Coronavirus is currently a new health threat across national borders, a phenomenon that requires cross-sectoral cooperation (Honey, 2020). It is necessary for the states to cooperate with non-state actors to ensure human and regional security. Cooperation between domestic actors such as federal, city and local agencies is considered to be necessary since COVID-19 pandemic poses a serious threat to public health and state security. If it is not taken seriously, the threat of COVID-19 will not only be greater on public health but will also have consequences for the economic sector, social relations, religious aspects, and also for politics.

Based on the above-mentioned problems, this article aims to explain and analyse the involvement of STI institutions which can support the foreign policy and international cooperation in dealing with COVID-19. Furthermore, this article uses qualitative design in explaining how diplomacy can help scientific collaborations which can mitigate the COVID-19 crisis in Indonesia. The novelty of this article is expected to be a useful reference for policy makers in every province in Indonesia to be able to utilise partners in cooperation and technological advancements to facilitate the mitigation process of the COVID-19.

Analytical Framework

Science Diplomacy

Science diplomacy is known as the scientific collaboration carried out by the State to solve a common problem by building international partnerships. It combines the role of scientists and diplomats, and a variety of definitions has been given to this term. The focus of these efforts is to solve international problems collaboratively while balancing economic prosperity, environmental protection, and societal well-being (Haynes, 2018). Science diplomacy has been an important tool to develop bilateral and multilateral relationships. The concept of science diplomacy is broadening with the growing understanding that science and technology underpins many critical challenges in the society and offers potential solution to solve common problems. Many challenges in the global economy related to health, economic growth, and climate change can be addressed through use of science diplomacy.

According to the Royal Society and the American Association for the Advancement of Science, science diplomacy refers to three main types of activities. First, science in diplomacy means that science can provide advice to inform and support foreign policy objectives. Second, diplomacy for science means diplomacy can facilitate international scientific cooperation. Also, science for diplomacy, scientific cooperation can improve international relations (Royal Society, 2010). In this article, the authors focus on the last aspect to explain Indonesian international cooperation to mitigate the Coronavirus in Indonesia. In this case, the role of scientists from a broad range of disciplines is critical for building an effective response to the COVID-19 crisis. The knowledge of scientists and diplomats is essential for shaping and understanding the options available and communicating information to the decision-makers.

The COVID-19 crisis shows the need for science diplomacy and multi-level governance to do research and share scientific information. It shows how important it is to establish a well-informed individual behavior alongside medical and governmental action. Science diplomacy here is being used for slowing down the spread of the virus and mitigating the impacts and effects of COVID-19. Science across all relevant disciplines will continue to play an important role in informing and helping to guide response and recovery for the COVID-19 crisis. The COVID-19 shows that science diplomacy has long-term benefits. It can foster collaborations with scientific community, local communities, state, and private sector.

International Cooperation

International cooperation has become a subject of much discussion in recent decades. International cooperation meets different interests of different countries that cannot be fulfilled domestically. In case of COVID-19 pandemic, countries need international cooperation because at the domestic level, the national governments cannot solve problems related to COVID-19 independently. The main issue of international cooperation is the extent to which mutual benefits can be obtained through cooperation between countries in the international arena (Perwita, 2005). International cooperation can be both formal and informal. Formal cooperation is easy to identify by surrounding and cooperating entities, whereas informal cooperation is initiated through interaction and requires more time to strengthen the relation. Collaborative arrangements can serve different purposes and are associated with institutionalisation and actions to build trust between countries (Winarno, 2011). Cooperation in the fields of economy, politics, education, and culture can be established by one country with another with the aim of mutual prosperity (Azizah, 2014). According to K. J. Holsti, cooperation is achieved from a combination of national, regional, and global needs (Holsti, 1988: 653). He defined international cooperation on several counts, including:

- International cooperation is the view that two or more interests, values, or goals meet and can yield, be promoted, or be fulfilled by both parties simultaneously.
- International cooperation is a country's view or hopes that the policies adopted by one country will help other countries achieve an interest.
- Agreement or problems between two or more countries to benefit from equality of interest.

International cooperation also involves interaction between individuals or organisations under international institutions. International cooperation has increasingly become a necessity because of greater interdependence due to the complexities of human life in society and the globalised world. Paul Viotti and Mark Kauppi's explain international relations as "the total of political, social, economic, cultural, and others interactions among state and even non-state actors" (Rudy, 2009: 72). Concerning globalisation in the current era marked by a number of "grand challenges" such as climate change, pandemics, inequalities, etc. cooperation is urgently needed between states, non-state actors, as well as with MNCs at multiple levels (Rudy, 2003).

Indonesia's Science Diplomacy to Deal with COVID-19

In Indonesia, the Ministry of Research and Technology and the National Innovation Research Agency are responsible for tackling COVID-19. This was characterised by the formation of a consortium on COVID-19 in collaboration with non-ministerial government agencies such as the Indonesian Academy of Sciences (LIPI), the Agency for the Assessment and Application of Technology (BPPT), the National Nuclear Energy Agency of Indonesian (BATAN), Indonesia National Institute of Aeronautics and Space (LAPAN), as well as universities and hospitals. This consortium is a bottom-up initiative in which each institution and university has proposed research and development activities related to the treatment of COVID-19 in Indonesia.

Air-Langga University has released research results on molecules and robots to serve patients. In addition, the Central Office for the Assessment and Application of Technology has published the results of research into the importance of using fans, and rapid tests that are tailored to national needs, and in collaboration with various parties. The consortium also continues to leverage innovation and technology through tax research and technological innovations that have produced a variety of medical devices and products for the treatment of COVID-19 in Indonesia. LIPI (Indonesian Academy of Sciences) is also supporting the development and capacity building for biosafety officers. LIPI has conducted capacity building on STI for neighboring countries as a part of MoFA's program. COVID-19 crisis has presented the opportunity for every party to contribute to the global and open data and to share the knowledge and scientific information to fight the Coronavirus. As a result of research in the fields of S&T with various parties, Indonesia has launched nine main products of innovation to deal with COVID-19 (Ristekbrin, 2020). The innovation findings include:

- The PCR test kid, named INDONESIA, was developed by the Clinical Microbiology Laboratory of the Faculty of Medicine, University of Indonesia.
- Rapid Diagnostic Test (RDT), a product of Gadjah Mada University, Airlangga University, Mataram University, Ministry of Health, and Microchip RDT an innovation from the Bandung Institute of Technology and Airlangga University.
- Four types of ventilators include emergency ventilators, ventilator vent-I, Venindo V0I and Venindo V03.
- Two immunomodulatory products with the brand Fatigon Promuno to suppress inflammation through decreased cytokine activity and fight infectious viruses.
- Plasma convalescence of COVID-19 patients who had been confirmed cured. This plasma is the product of innovation from the Ministry of Health, Saiful Anwar Regional Hospital Malang, Sardjito Hospital Yogyakarta, Soetomo Regional Hospital Surabaya, and Kariadi Hospital Semarang.
- The biosafety level 2 mobile laboratories under the name Mobile Lab BSL 2 was developed by the Technology Assessment and Application Board. This laboratory can be moved by container truck and meets WHO standards that are ready to be used for

PCR tests with the MBSL2 application integrated with COVID-19 Monitor.

- Artificial Intelligent System for detecting COVID-19 developed by the Agency for Assessment and Application of Technology. This system is medical imaging based on artificial intelligence to detect COVID-19 based on CT scan and X-Ray.
- Two robots that help medical workers are named, RAISA Medical Assistant Robot developed by the Sepuluh November Institute of Technology, Surabaya and Airlangga University. Autonomous UVC Mobile Robot, developed by Telkom University and the Indonesian Institute of Sciences (LIPI). This robot is capable of disinfecting and sterilizing isolation rooms for COVID-19 patients.
- Powered Air Purifying Respirator is a tool for personal protection and respiratory aids for medical personnel. This tool was developed by Al-Azhar University, Indonesia.

In addition to the nine main innovation products, Indonesia together with educational institutions and research institutions that are members of the Consortium have also produced 55 innovative products to accelerate the handling of COVID-19 in Indonesia. The United Kingdom also collaborated with Indonesian scientists from the University of Indonesia, Padjadjaran University, and the Bandung Institute of Technology in handling COVID-19. One of them is through effective multidisciplinary research collaboration between scientists from the two countries. In this context, the Deputy Chancellor of Global Engagement from the University of Nottingham, Robert Mokaya noted that the valuable international partnerships are an important step to overcome the challenges of solving global problems and development of science (lamppost, 2020).

Science diplomacy has gained prominence for Indonesia's struggle for solving COVID-19 pandemic globally. Indonesia, which is a developing country, is far from self-sufficiency in terms of national health capacity. This is evidenced by the data reported by Bloomberg where Indonesia is not ranked in the ranking of the 50 healthiest countries in the world, proving that country's health capacity has not been efficiently and maximally implemented (Liputan6, 2019). To support the treatment of COVID-19, the Indonesian Minister of Foreign Affairs, Retno Marsudi noted that country has to develop the vaccine either through indigenous efforts or build partnerships with foreign countries to ensure the availability of vaccines through joint development and distribution through purchase. Indonesia realises that mitigating the COVID-19 pandemic independently will not create a meaningful impact, as the availability of Indonesian capabilities is still not optimal in addressing national health problems. Therefore, Indonesia has involved outsiders in tackling the spread of COVID-19 (Triwibowo, 2020).

The current situation becomes a challenge to Indonesia's national resilience in all aspects during the pandemic therefore, Indonesia continues to improve its diplomacy, which is more focused on using science-based diplomacy to address challenges caused by COVID-19. At the 25th ASEAN Coordination Council (ACC) meeting, Indonesia's presented the four key diplomatic objectives for COVID-19:

- Implementation of the recommendation of the meetings of Health Ministers of ASEAN and ASEAN + 3 Member States.
- Submission of an agreement "Supply Chain and flow of Goods during the Outbreak" to be discussed at the ASEAN + 3 Summit Forum.
- Emphasising on health of all ASEAN citizens without exception.
- Propose funding to meet all medical needs in tackling COVID-19 financed by the collection of the ASEAN COVID-19 Response Fund originating from the ASEAN Development Fund and ASEAN + 3 (LIPI, 2020).

At the ASEAN Special Summit, Indonesian President Joko Widodo agreed on a protocol to break the supply chain barriers for supply of COVID-19 materials in border areas and to protect ASEAN citizens. President Jokowi also stressed the need to step-up cooperation with ASEAN countries, and the Indonesian Foreign Minister further reiterated it at the Ministerial Meeting of the Alliance for Multilateralism (AoM). Indonesia also played an active role in the International Coordination Group on COVID-19 (ICGC) forum by supporting collective efforts to promote vaccine production and distribution and also global economic recovery after the COVID-19 pandemic (LIPI, 2020).

Indonesia's Science Diplomacy mainly aims to achieve cooperation in realising the supply of affordable COVID-19 vaccines and medicines. Therefore, the Indonesian diplomacy is focused on innovative steps to engage with the international vaccination efforts involving as many as 120 COVID-19 vaccine candidates that are being developed. This was stated at every international meeting by the Indonesian Minister of Foreign Affairs, including the Ministerial Coordination Group on COVID-19 (MCGC) which was attended by the Ministers of Foreign Affairs from 11 Countries (Galamedianews, 2020).

Indonesia also hosted the Global Public Health Forum (FGPH), which was conducted virtually on the theme of "Affordable Health for All". The FGPH, which has been deliberating on the challenges relating to COVID-19 pandemic, has emphasised upon the cooperation between countries so that each country addresses the challenges posed by the pandemic (Bio Farma & CNN Indonesia, 2020). Through this forum, Indonesia saw the success of science diplomacy conducted in the hope that affordable vaccines and medicines for COVID-19 could be produced through this collaboration.

Through science diplomacy in this forum, Indonesia aims to enhance capacity in response, detection, prevention, availability of medical devices, and medicines necessary for dealing with COVID-19 which are always available through joint production; and to exploit opportunities for Indonesia to improve collaborative research on COVID-19 drugs and vaccines, collaboration in clinical trials; and explore opportunities for Indonesia's participation in up-scaling new COVID-19 drug and vaccine production when discovered (Gunawan, 2020). Regarding vaccine production, Biofarma is expected to collaborate with the Health Development Research Agency and the national consortium. Besides, Indonesia through LIPI also collaborates with foreign research institutions such as the Coalition for Epidemic Preparedness

Innovation (CEPI) from Norway, as well as manufacturers from China that have been recognized by WHO.

The development of Indonesian credentials in the fields of science and technology, to address global challenges is emphasised by the Indonesian government (LIPI, 2019). One of the concrete actions taken by Indonesia through its diplomatic actions is being carried out by co-sponsoring the draft COVID-19 resolution that has been approved by the World Health Assembly (WHA). This COVID-19 resolution was the only outcome at the 73rd extraordinary meeting of the WHA that discussed the treatment of the COVID-19 pandemic and was adopted by consensus. During negotiations at WHO, the delegation from Indonesia continued to play a role in making this resolution generally accepted until finally the draft resolution was adopted by the WHO, as Indonesia would also support the evaluation of the treatment of the COVID-19 pandemic (Ministry of Foreign Affairs, 2020).

The Ministry of Research and Technology/National Research and Innovation Agency Republic of Indonesia (RISTEK-BRIN), in collaboration with the Education Fund Management Institution (LPDP) and the Indonesian Science Fund (DIPI) participated in the program "Indonesian Diaspora Innovation Research Collaboration Scheme". The programme aims to accelerate the process of mastering, developing and using science and technology to address the COVID-19 pandemic in Indonesia. This research was conducted in collaboration with national researchers with the Indonesian Diaspora in various countries, both at universities, research institutes, and industry (DIPI, 2020).

Science Diplomacy has brought Indonesia into a safer zone to address and deal with the COVID-19. The United States of America became one of the countries that collaborated with Indonesia through science diplomacy. Indonesia and ASEAN developed an agreement with the US to implement several mechanisms related to Science Diplomacy to increased cooperation including: 1) increase cooperation in human resources with joint research, education, and training for a range of health professionals; 2) increase cooperation in the development of vaccines for the treatment of COVID-19 and 3) greater commitment to investment and strengthening the health system through universal health coverage, especially in primary health service and strengthening the capacity of human resources in the health sector.

The agreement that Indonesia has co-developed with the US with ASEAN is a form of science diplomacy to address the adverse impacts of COVID-19. The science diplomacy undertaken is an important achievement for the Indonesian leadership as the chair of ASEAN cooperation in the health sector during 2020-2021. The results of the agreement are also expected to build a lasting relationship with the US to address global health challenges (RI Ministry of Health, 2020). In addition, China is Indonesia's partner to cope with the impact of the global pandemic of COVID-19. In this case, Eijkman Institute and Airlangga University is conducting vaccine research and development with the Chinese government through the Sinovac Company (Wartakotalive, 2020).

Subsequently, Indonesian scientific diplomacy cooperation was also conducted with South Korea. The private firm, PT Kalbe Farma representing Indonesia

signed a Memorandum of Understanding in conjunction with the development of DNA vaccines against COVID-19 with the Genexine Company from South Korea. Kalbe's collaboration is an attempt to support the government to meet vaccine needs in Indonesia (detikfinance, 2020).

In addition to developed countries, Indonesia is also engaged in science diplomacy with developing countries in Africa, namely Morocco and Tunisia to improve health services in the two countries. In this collaboration, PT Bio-Farma became the party that led the vaccine development project (Kontan, 2020). Through various collaborations based on scientific diplomacy, Indonesia aims to fulfill its capacity and national health problems and contribute to global health problems.

International Cooperation to Deal with Covid-19 outbreak

In the context of international cooperation, two important events have highlighted the role of Indonesia and ASEAN in the fight against COVID-19. First, on 14 April 2020 Indonesia and ASEAN initiated a special Summit Conference on the treatment of COVID-19, which led to closer cooperation between the ASEAN Member States. The Summit Conference resulted in several commitments, namely:

- Strengthen health cooperation for the community;
- Prioritise the well-being of the ASEAN Community by providing appropriate assistance;
- Promote effective and transparent public communication;
- Reaffirm the obligation to take collective action and coordinate policies;
- Emphasise the importance of multi-stakeholders in responding to COVID-19 and health emergencies
- Facilitate cooperation, including proposal for the creation of ASEAN Response COVID-19.

Second, the ASEAN Summit Conference was virtually attended by ten ASEAN Heads of State plus three regional members' countries such as China, South Korea, and Japan. The main message of this meeting was to deal with trans-border spread of COVID-19 in every ASEAN country. The meeting also agreed to prevent traffic obstructions for goods, in particular staple foods, medicines, and the circulation of medical equipment, to maintain regional availability. Also, empower professional medical staff and improve expertise and skills of health professionals through ASEAN+3 Field Epidemiology Training Network (FETN), and the creation of a private sector engagement platform.

ASEAN member countries also need to be invited to work together in exchanging information regarding the the spread of the virus in their respective countries (Alunaza, 2020). In this context, the handling of the Coronavirus is no longer only a concern of various countries individually within their respective territorial borders. Cross country cooperation is urgently needed to respond quickly to cross-border health threats, including the Coronavirus. Concerns about the spread of COVID-19 in Indonesia pose a challenge for the government to optimise its preparedness to combat this pandemic. Indonesia has started to strengthen cooperation with Japan and India in providing vaccines and medicines to cure Coronavirus infections (Indonesian Ministry of Foreign Affairs,

2020). Japan pledged to ship Avigan drugs to Indonesia as one of Japan's priority countries (Indonesian Ministry of Foreign Affairs, 2020).

Subsequently, cooperation in the procurement of medicines was also mobilised by the Indonesian Minister of Foreign Affairs with the Indian Minister of Foreign Affairs, followed by indirect interaction between the Indian Prime Minister and the President of Indonesia to make every effort to ensure that all parties are facilitated and maintained good relations. India has assisted Indonesia in addressing the COVID-19 pandemic in the form of pharmaceuticals. India believes the relationship with Indonesia as a maritime country will strengthen cooperation between the two countries in combating the COVID-19 pandemic (CNN Indonesia, 2020).

Indonesia is also partnering with South Korea and also inviting Japan to cooperate in the production of medical devices needed in COVID-19 countermeasures. This joint production has been carried out in such a way that difficulties for medical devices such as PPE and masks can be overcome in any country (CNN Indonesia, 2020). In this process of production cooperation, Indonesia has also approached Turkey as a country that has the raw materials necessary for the manufacture of medical equipment to deal with the COVID-19, and allow the export these raw materials so that the production in Indonesia, South Korea, and Japan progresses well and can be fulfilled (CNN Indonesia, 2020).

Indonesia has used the opportunity to strengthen cooperation with neighboring countries that are developed countries in South East Asia. Indonesia used to have cooperation in several areas with Singapore, and now Indonesia is determined to strengthen its cooperation relations with Singapore in light of the COVID-19 pandemic. Singapore has shown its role in assisting the government and private parties in Indonesia, and some assistance has been provided by Singapore through the Temasek Foundation, including 3 million surgical masks for Riau islands, 40.00 RT PCR based test kits targeting Jakarta, Bali and Batam accompanied by other assistance to medical personnel (Indonesian Ministry of Foreign Affairs, 2020). Indonesia and Singapore are also working together to meet the non-medical needs, such as building quarantine facilities and providing 25,000 sets of cots and mattresses (Indonesian Ministry of Foreign Affairs, 2020). Cooperation between Indonesia and Singapore is expected to jointly meet the medical and non-medical needs of the two countries by leveraging the capabilities of each country (Indonesian Ministry of Foreign Affairs, 2020).

Indonesia has close relations with the United Arab Emirates and already has 16 cooperation agreements in various areas. Before the widespread dissemination of COVID-19, Indonesia had partnered and improved relations with the United Arab Emirates in the health sector, with the Health Cooperation Agreement signed on January 12, 2020 during the visit of the Indonesian President to Abu Dhabi (Rokom, 2020). The joint action plan of the agreement between Indonesia and the United Arab Emirates covers several programs, including 1) health services, 2) pharmaceuticals and medical devices, 3) disease prevention and control, and 4) development of human health resources (Rokom, 2020).

Bilateral relations that have existed between Indonesia and Vietnam for 65 years have led the two countries to strengthen and improve their cooperation. Receiving praise from the World Health Organization (WHO) in the Southeast Asia region, cooperation between the Indonesian Embassy in Hanoi and the Embassy of the Socialist Republic of Vietnam in Jakarta, resulted in an agreement in fighting the COVID-19 pandemic (Yulianingsih, 2020). On April 5, 2020, Vietnam sent assistance in the form of 500 test kits for coronavirus detection to the Indonesian government (Yulianingsih, 2020).

On the other hand, cooperative relationships with China have also helped Indonesia in overcoming the COVID-19 challenge. In mitigating the COVID-19 pandemic, the governments of Indonesia and China have intensified the intensity of communication and cooperation by establishing a reciprocal relationship. As reported by SindoNews, at the beginning of this pandemic, the Indonesian government has assisted China by sending some assistance to facilitate the management of the outbreak.

In response to similar actions, the Chinese government also sent assistance to Indonesia on March 24, 2020. The assistance provided was in the form of medical logistics such as corona test kits, N-95 masks, various surgical masks, medical protective clothing, and portable ventilators (CNN Indonesia, 2020). Subsequently, the two countries also collaborated scientifically through coordination between PT Bio-Farma and Sinovac in making the COVID-19 virus vaccine. Quoted from Detik-Finance, BUMN's holding company active in the pharmaceutical sector, namely PT. Bio-Farma plans to replicate the results of the production of a virus vaccine by Sinovac, the results of the replication are intended for mass production to target the COVID-19 virus in Indonesia (detikFinance, 2020). In addition to cooperation with China, the Indonesian government is also cooperating with the United States. The humanitarian investment provided by America was then used to meet the needs and availability of medical equipment in Indonesia. Besides, the support provided by the United States also includes the provision of laboratory facilities for vaccine development.

Conclusion

The COVID-19 outbreak clearly shows the necessity for science diplomacy and new instruments of multi-level governance which transcend national and cultural boundaries as powerful tools to tackle the global challenge of COVID-19. In this respect, Indonesia can take full advantage of the opportunities provided by science diplomacy in finding solutions to common challenges. During the present corona virus outbreak, international scientific cooperation has played a very vital role. International research cooperation is essential in prevention and control of the spread of the virus. As a developing country, Indonesia can formulate a number of international scientific cooperation to maintain public health emergency preparedness.

References

Alunaza, Hardi. 2020. Corona Virus; Global Human Security Threats and International Cooperation. Retrieved from http://www.untan.ac.id/corona-virus-global-human-security-threats-and-international-cooperation/

Azizah, Nur. 2014. Disampaikan dalam Perkuliahan Kerjasama Humaniter Internasional pada tanggal 14 November 2014. Program Magister Ilmu Hubungan Internasional Universitas Muhammadiyah Yogyakarta

Bio Farma and CNN Indonesia. 2020. Jadi Tuan Rumah FGPH, Indonesia Bahas SoalVaksin COVID-19. Retrieved from https://www.cnnindonesia.com/teknologi/20200529212500-204-508136/jadi-tuan-rumah-fgph-indonesia-bahas-soal-vaksin-covid-19

CNN Indonesia. 2020. *Bantuan Medis Corona dari China Tiba di Indonesia.* Retrieved from https://www.cnnindonesia.com/internasional/20200328213252- 113-487878/bantuanmedis-corona- dari-china-tiba-di-indonesia

CNN Indonesia. 2020. PM India Telpon Jokowi Bahas Penanganan Corona. Retrieved from https://www.cnnindonesia.com/internasional/20200429140639-113-498457/pm-india-telepon-jokowi- bahas-penanganan-corona

CNN Indonesia. 2020. RI gandeng Korsel dan Jepang untuk Produksi Alat Medis Corona. Retrieved from https://www.cnnindonesia.cominternasional/20200416152616-106-494208/ri-gandeng-korsel-dan-jepang-untuk-produksi-alat-medis-corona

Detik. 2020. *Menlu Sebut RI Komunikasi dengan Norweygia dan China Kembangkan Vaksin COVID*. Retrieved from https://m.detik.com/news/berita/d-5050862/menlu-sebut-ri-komunikasi dengan-norwegia-dan-china-kembangkan-vaksin-covid/1

Detikfinance. 2020. *Induk Holding BUMN Farmasi Gandeng China Kembangkan Vaksin Corona*. Retrieved from https://finance.detik.com/berita-ekonomi-bisnis/d-4985064/indukholding-bumn-farmasi-gandeng-china-kembangkan-vaksin-corona

Detikfinance. 2020. *RI-Korsel Kerja Sama Produksi Vaksin COVID-19*. Retrieved from https://finance.detik.com/industri/d-5032675/ri-korsel-kerja-sama-produksi-vaksin-covid-19

DIPI. 2020. Rispro International Collaboration-Inovation Diaspora 2020. Retrieved from https://www.dipi.id/rispro-international-collaboration-inovasi-diaspora-2020/

Djalante, Riyanti et all. (2020). Review and Analysis of Current Responses to Covid19 in Indonesia Period of January to March 2020. Progress and Disaster Science Vol 6. Hal:1-2

Galamedianews. 2020. Indonesia SasarKerja Sama InternasionalWujudkanVaksin dan Obat-obatan Covid-19. Retrieved from https://www.galamedianews.com/nasional/255721/indonesia-sasar-kerja-sama-internasional-wujudkan-vaksin-dan-obatobatan-covid19.html

Gunawan, Indra. 2020. Indonesia Jadi Tuan Rumah Forum Public Global Health (FPGH) 2020. Retrieved from https://www.sonora.id/read/422171452/indonesia-jadi-tuan-rumah-forum-global-public-health-fgph-2020?page=all

Heynes, Trevor. 2018. Science Diplomacy: Collaboration in a rapidly changing world. Retrieved from http://sitn.hms.harvard.edu/flash/2018/science-diplomacy-collaboration-rapidly-changing-world/

Holsti, K.J. 1988. *Politik Internasional, Kerangka Untuk Analisis*, Jakarta: Erlangga. Hal: 653

Humas. 2020. CICP Lakukan Kolaborasi Riset Internasional Mengenai Covid-19. Retrieved https://psikologi.ugm.ac.id/cicp-lakukan-kolaborasi-riset-internasional-mengenai-covid-19/

Indonesian Ministry of Foreign Affairs. 2020. Kerja Sama Indonesia dan Singapura dalam Hadapi COVID-19. Retrieved from https://kemlu.go.id/portal/id/read/1233/berita/kerja-sama-indonesia-dan-singapura-dalam-hadapi-covid-19

Indonesian Ministry of Foreign Affairs. 2020. Kerja Sama Pengadaan Obat COVID-19 Indonesia dengan Jepang dan India. Retrieved from https://kemlu.go.id/portal/id/read/1189/berita/kerja-sama-pengadaan-obat-covid-19-indonesia-dengan-jepang-dan-india

Indonesian Ministry of Foreign Affairs. 2020. Kerja Sama RI-Korea Selatan untuk Penanganan Wabah COVID-19 di Indonesia. Retrieved from https://kemlu.go.id/portal/id/read/1185/berita/kerja-sama-ri-korea-selatan-untuk-penanganan-wabah-covid-19-di-indonesia

Indonesian Ministry of Foreign Affairs. 2020. Ranses COVID-19 Disahkan WHO, Indonesia Dukung Evaluasi Penanganan Pandemi. Retrieved from https://kemlu.go.id/portal/id/read/1317/berita/ranres-covid-19-disahkan-who-indonesia-dukung-evaluasi-penanganan-pandemi.

Jones, Lora et al. 2020. Coronavirus: A Visual Guide to the Economic Impact diakses melalui. Retrieved from https://www.bbc.com/news/business-51706225

Kemenkes RI. 2020. *Menkes Dorong Negara Asean dan AS Perkuat Kerjasama Lawan Covid-19*. Retrieved from http://sehatnegeriku.kemkes.go.id/baca/rilis-media/20200430/5233809/menkes dorong-negara-asean-dan-as-perkuat-kerjasama-lawan-covid-19/

Kompas. 2020. *Indonesia Terima 3 Juta Dollar Bantuan Penangan Covid-19 dari Pemerintah AS*. Retrieved fromhttps://nasional.kompas.com/read/2020/04/23/15063001/indonesia-terima-3juta-dollar-bantuan-penanganan-covid-19-dari-pemerintah

Kompas. 2020. PBB Hasilkan Resolusi Pertama Covid-19, Indonesia Ikut Menggagas. Retrieved from https://nasional.kompas.com/read/2020/04/03/13520021/pbb-hasilkan-resolusi-pertama-covid-19-indonesia-ikut-menggagas

Kontan. 2020. *Kembangkan vaksin, Indonesia jalin kerjasama dengan Maroco dan Tunisia.* Retrieved https://nasional.kontan.co.id/news/kembangkan-vaksin-indonesia-jalin kerjasama-dengan-maroco-dan-tunisia

Kurnia, Tomi. 2020. Bantu RI Lawa Corona COVID-19, Uni Emirat Arab Kirim 20 Ton Alat Medis. Retrieved from https://www.liputan6.com/global/read/4239326/bantu-ri-lawan-corona-covid-19-uni-emirat-arab-kirim-20-ton-alat-medis

Lampost. 2020. Ilmuan Indonesia dan Inggris Bersatu Melawan Korona. Retrieved from https://www.lampost.co/berita-ilmuwan-indonesia-dan-inggris-bersatu-melawan-korona.html

LIPI. 2018. Bentuk Diplomat Sains, LIPI Bekali Peneliti dengan Ilmu Diplomasi dan Negosiasi. Retrieved from http://lipi.go.id/siaranpress/bentuk-diplomat-sains-lipi-bekali-peneliti-dengan ilmu-diplomasi-dan-negosiasi/20043

LIPI. 2019. Diplomasi Sains Untuk Membangun Kolaborasi Penelitian Internasional. Retrieved from http://lipi.go.id/berita/diplomasi-sains-untuk-membangun-kolaborasi-penelitian-internasional/21826

LIPI. 2020. PolitikLuar Negeri Indonesia dan Pandemi COVID-19. Retrieved from http://www.politik.lipi.go.id/kolom/kolom-1/politik-internasional/1369-politik-luar-negeri-indonesia-dan-pandemi-covid-19

Liputan6. 2019. *Tak Ada Indonesia dalam Daftar 50 Negara Tersehat di Dunia.* Retrieved from https://www.liputan6.com/health/read/3908054/tak-ada-indonesia-dalam-daftar 50 negara-tersehat-di-dunia

Perwita, Banyu. 2005. *Pengantar Ilmu Hubungan Internasional*, Bandung: Rosda Karya. Hal: 33-34

Pradanti, Safera Della. 2019. *Evaluasi Pelaksanaan Formal Risk Assessment Middle East Respiratory Syndrome Coronavirus Tahun 2018*. Jurnal Berkala Epidemiologi Vol 7 (3). Hal 199

Republika. 2020. *China akan Kerja Sama dengan Indonesia Atasi Corona.* Retrieved from https://republika.co.id/berita/q8s4er377/china-akan-kerja-sama-dengan-indonesia-atasicorona

Ristekbrin. 2020. Produk Inovasi Penanganan COVID-19. Retrieved from https://www.ristekbrin.go.id/covid19/

Rokom. 2020. Indonesia-Persatuan Emirat Arab Jalin Kerja Sama Kesehatan. Retrieved from http://sehatnegeriku.kemkes.go.id/baca/rilis-media/20200304/2733228/indonesia-persatuan-emirat-arab-jalin-kerja-kesehatan/

Rudy, May. 2003. *Hubungan Internasional Kontemporer dan Masalah-Masalah Global*, Bandung: Refika Aditama. Hal: 97

Rudy, May. 2009. *Administrasi dan Organisasi Internasional*, Bandung: Refika Aditama. Hal: 37

Septiari, Dian. 2020. Indonesia Calls for Support for First UN General Assembly Resolution on Covid-19 retrieved from https://www.thejakartapost.com/news/2020/03/29/indonesia-calls-for-support-for-first-un-general-assembly-resolution-on-covid-19.html

SindoNews. 2020 *China Kirim Bantuan Medis ke Indonesia untuk Lawan COVID-19* Retrieved from https://international.sindonews.com/berita/1566886/40/china-kirim-bantuan-medis-keindonesia-untuk-lawan-covid-19

Situmorang, Mangadar. 2020. Covid19 Mengubah Lanskap Konflik Global? Jurnal Hubungan Internasional. Bandung: Universitas Katolik Parahyangan. Hal: 1-3

Sugiyono. 2011. *Metode Penelitian Kuantitatif Kualitatif dan R&B*. Bandung: Alfabeta. Hal: 246

Tempo. 2020. *Cegah Virus Corona, Pemerintah Tutup Akses dari dan Menuju Cina* Retrieved from https://bisnis.tempo.co/read/1302616/cegah-virus-corona-pemerintah-tutup-akses-daridan-menuju-cina/full&view=ok

The Royal Society. 2010. New Frontiers in Science Diplomacy. London: Science Policy Centre. P: 9-11

Triwibowo, Albert. 2020. Diplomacy and Covid19: A Reflection. Jurnal Hubungan Internasional. Bandung: Universitas Katolik Parahyangan. Hal: 6

WartakotAlive. 2020. *Universitas Airlangga Kerja Sama dengan China untuk Vaksin Corona, Ini Jenis yang Lagi Dikembangkan*. Retrieved from https://wartakota.tribunnews.com/2020/06/12/universitas-airlangga-kerja-sama-dengan china-untuk-vaksin-corona-ini-jenis-yang-lagi-dikembangkan

Winarno, Budi. 2011. *Isu-Isu Global Kontemporer*, Yogyakarta: CAPS. Hal: 96-97.

Xie, Mingxuan dan Chen Qiong. 2020. Insight into 2019 Novel Coronavirus — an updated intrim review and lessons from SARS-CoV and MERS-CoV. *International Journal of Infectious Disease*. Hal: 2-3.

Yulianingsih, Yanti. 2020. Vietnam Kirim 500 Alat Tes Corona COVID-19 untuk Indonesia. Retrieved from https://www.liputan6.com/global/read/4220439/vietnam-kirim-500-alat-tes-corona-covid-19-untuk-indonesia.

ARTICLE

COVID-19 Crisis and India's Health Sector Preparedness

T. C. James*

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Introduction

"There have been as many plagues as wars in history; yet always plagues and wars take people equally by surprise," so wrote Albert Camus in his famous novel, *The Plague* published in 1947. At the end of the second decade of the 21st century, when the new Coronavirus Disease – 2019 (COVID-19) pandemic has spread across the globe from one country to the other, from one continent to another, finally embracing all countries and continents in its vice grip, the statement still remains equally valid. Many countries with advanced health-care systems like those in Western Europe and North America were in the smug belief that pandemics are a thing of the past for them, and that the current challenge for them is to overcome the non-communicable diseases (NCDs) like cancer, cardiac diseases, and issues relating to obesity, old age, antimicrobial resistance, apart from mental health problems. However, COVID-19 took them by surprise. The policy and strategic responses of most of these countries showed a lack of preparedness to face an epidemic crisis. Consequently, there were heavy losses of life in those countries. Countries of the South who are still attempting to tackle infectious diseases were not as surprised, but the pandemic is threatening to inflict heavy casualties on them too. The article tries to explore how prepared is India's health sector for the crisis?

Healthcare in India

Health in India is backed by constitutional commitments and judicial pronouncements. The Directive Principles of

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State Policy in Part IV of the Constitution in a number of articles explicitly referred to the State's responsibility on health. As per Article 47, improvement of public health is a primary duty of the State. While health is not mentioned as a fundamental right, the Supreme Court has interpreted Article 21 about the fundamental right to life and liberty, as encompassing right to live with human dignity and, therefore, includes protection of health in view of the Directive Principles (Morcha, B. M., 1984). Developing this further, the Supreme Court has held right to health as being integral to the right to life and the State has the obligation to provide health facilities and also maintain health services.[1] India also has a strong and comprehensive Epidemic Diseases Act dating back to 1897, even before the Spanish Flu epidemic a century ago. With such a firm legal foundation, healthcare sector in India should rightly be expected to be equipped to take care of all eventualities including pandemics by central and state governments.

Unlike in the West, India has a disease burden that spans across communicable and non-communicable diseases. The fight against infectious diseases like tuberculosis (21,55,894 registered cases in 2018 as per *National Health Profile, 2019*), malaria, etc. is still going on in the country. Virus outbreaks like Swine Flu, Nipah, and Dengue are not mere historical facts in India but a current reality.[2] Even now communicable diseases including various viral diseases like measles, rubella and polio account for more than one fourth of the total disease burden in the country. The NCDs have been showing a rising trend during the last decade and in 2018 accounted for 63 per cent of total disease burden. This includes 27 per cent share for cardiovascular diseases, 9 per cent share for cancer and 11 per cent share for chronic respiratory diseases. India also has the new age challenges of mental depression, Schizophrenia, Alzheimer's disease, and so on. Further, injuries account for 11 per cent. According to the Centre for Disease Control and Prevention of the United States (US) Department of Health and Human Services, the top 10 causes of death in India are Ischemic heart disease, Chronic obstructive pulmonary disease, Stroke, Diarrheal diseases, Lower respiratory infections, Tuberculosis, Neonatal disorders, Asthma, Diabetes, and Chronic kidney disease (CDC, 2020). When the health care system has been facing such a diverse and ever changing health burden which spans across both communicable and non-communicable diseases along with regular epidemic outbreaks, the health care system is expected to be ready for all health emergencies and crises since from past experience health alarms can go off any time. Good governance, *inter alia*, means learning from experience and making preparations so that the administration is effective and efficient in responding promptly to national challenges including in public health.

Healthcare preparedness involves many areas. The moot question is whether the system itself is sound and healthy, meeting the various standards expected of a modern healthcare system and fully functional and accessible. This also applies to infrastructure, human resources and services including diagnostics. It is a fact that Indian healthcare system is ranked low globally; *the Lancet* index put it at 145 in 2016 (Fullman et al., 2018). The Healthcare Access and Quality Index by *the Lancet* cover 195 countries and are based on

Global Burden of Diseases, Injuries and Risk Factors Study, 2016. The data is from 1990 to 2016 and the study has used "32 causes from which death should not occur in the presence of effective care to approximate personal health-care access and quality by location and over time" (Fullman et al., 2018). The basic premise is that a key component of achieving universal healthcare (UHC) is that all people have access to quality healthcare. While there are still areas left to be covered by the study such as healthcare financing, risk insurance and affordability. The study is important for two reasons; one, it provides valuable inputs to national health policy makers annually based on which they can make improvements wherever needed, particularly in the efforts to achieve the commitment to SDG-3 by 2030, and, two it affects global perception of a country's healthcare which may affect health sector co-operations and partnerships. While India's rank has improved from 153 in 1990, it lags behind even its neighbours like Bangladesh and Sri Lanka. A major reason could be that investment in the sector has not been of the desired level. The low base on which independent India started with, the high growth rate of population, and the perennial issue of malnutrition coupled with low investment in health care sector, have set up major challenges for the healthcare system which always kept it on its toes and, to borrow an imagery from another sector, in a 'hand to mouth existence'.

In an environment where curative care takes precedence over preventive care, healthcare facilities are more important than others. The healthcare infrastructure in the country has expanded significantly in the last many years. As of 31 March, 2019, a total of 1,96,443 (rural – 1,87,601 and urban – 8,842) Primary Health Centres (PHCs) (including Sub-Centres, Health and Wellness Centres and community health centres) existed in the country (MoHFW, 2019). These are the first port of call for health issues for the people. Access to a healthcare centre including a doctor nearby is a great reassurance for people in general and patients in particular. It also is a means for the authorities to reach to the people with immediate medical care in emergent situations. The government target, since the 6th Five Year Plan is to provide one PHC per 20,000 population in hilly, tribal, or difficult areas and one per 30,000 population in plain areas (MoHFW, 2019). These PHCs, etc. are linked with hospital facilities. India has 25,778 hospitals with a bed capacity of 7,13,986 (CBHI, 2019). The average rural population covered by a PHC is 35,567 as of 31 March 2019. There is huge disparity between urban and rural areas in the matter of healthcare infrastructure and also between states. For example, the ratio of urban density to rural density of allopathic doctors is 4.0 at all India level and 18.6 in Meghalaya, 10 in Jammu & Kashmir, 8 in Orissa, 6.8 in Tamil Nadu, 6 in Rajasthan, 5.1 in Karnataka, 4.6 in Madhya Pradesh and Kerala, 4.5 in Bihar, 4 in Maharashtra, 3.5 in Uttar Pradesh, 2.6 in Andhra Pradesh, 2.4 in West Bengal, and 1.8 in Haryana (Fan & Anand, 2016). Such variations exist in the case of nurses and midwives also.

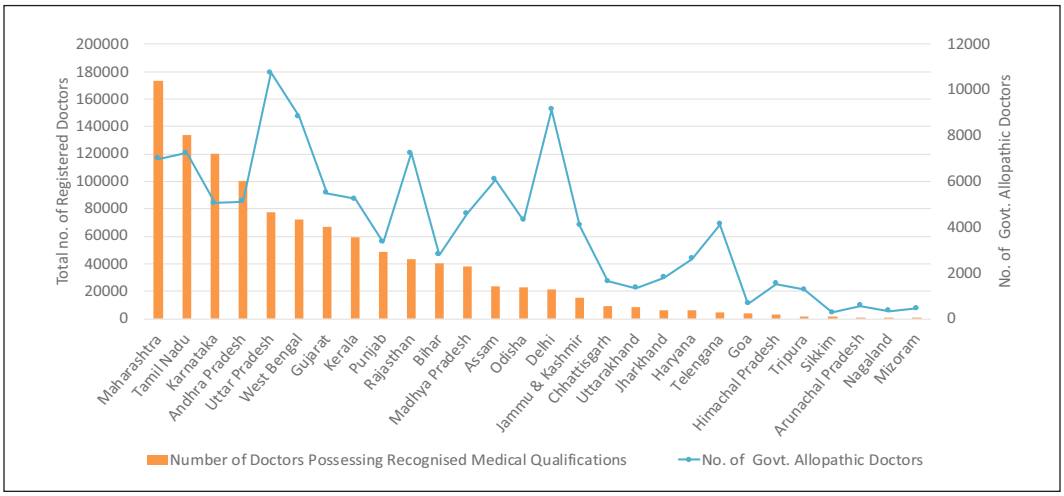
The second aspect of this is that of health human resources. India is estimated to have 9,23,749 doctors and 29,66,375 nurses in 2018 (Fan & Anand, 2016). This works out to one doctor for 1,405 persons (*The Economic Survey 2019-2020* gives

the figure 1:1456) and one nurse per 438 persons. The WHO recommends one physician per 1,000 persons and 2.3 health workers (doctors, nurses/midwives) per 1,000 population. That would mean India needs 12,98,041 doctors and a total of 29,85,494 health workers (nurses, midwives, etc.). From the Sustainable Development Goal (SDG) angle, WHO prescribes a density of 4.5 physicians, nurses and midwives per 1000 population to achieve SDG-3 health targets by 2030 (WHO, 2016). The trend, however, is positive; the number of allopathic doctors at PHCs has increased from 20,308 in 2005 to 29,709 in 2019 and the shortfall is now about 6 per cent of the existing requirement only (MoHFW, 2019). There are private practitioners also, both in urban and rural areas, though there are concerns about their medical qualifications. As per a WHO study, 81 per cent practising in rural areas and 42 per cent in urban areas do not have proper medical qualifications (Fan & Anand, 2016). There is certainly shortage of properly qualified medical personnel, but health care workforce cannot be hiked at short notice since they need long education and training, which needs careful planning and allocation of resources. *The Economic Survey* has rightly recommended significant enhancement of the student intake capacity in medical colleges.

There is yet another dimension to this. The total number of registered modern medical practitioners is 11,54,686.[3] However, the number working in the government sector is 1.1 lakh only, i.e., less than 10 per cent of the total. The rest are presumably in the private sector. This makes the doctor-population ratio 1:11,082 if we take government facilities alone, since that is what is available at government's immediate command in an emergency. In the matter of human resources also high variations exist between urban and rural areas apart from among states. As per the WHO study, in Maharashtra, the concentration both of allopathic doctors (12.01 per cent) and of nurses (15.81 per cent) is substantially higher than the state's population share (9.42 per cent) whereas in Orissa the concentration of allopathic doctors is low (1.54 per cent) compared to its population share (3.58 per cent) but has high concentration of nurses (6.17 per cent). Maharashtra with an estimated population of 11.23 cr. has 173,384 Allopathy doctors whereas Uttar Pradesh with a population of 19.98 cr. has only 77,549 such doctors. At the same time, in the government sector Uttar Pradesh has 10,754 doctors whereas Maharashtra has only 6,981 (MoHFW, 2019). The doctor density in Punjab is 2.6 times higher than that in Bihar (Fan & Anand, 2016). Healthcare sector in India has to catch up much, particularly in infrastructure and human resources and in spreading evenly across states.

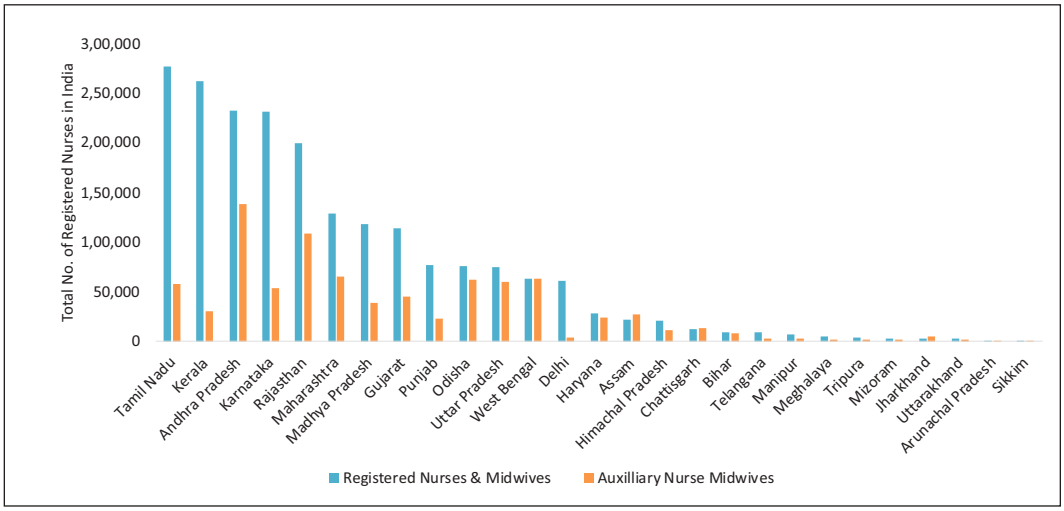
Curative medical care depends on affordable access to quality medicines. Availability of medicines and medical products is dependent on production and distribution. Because of its strong generic pharmaceutical industry, India has the reputation of being the "pharmacy of the world" and the prices of medicines in India are generally less than those in the developed countries. This makes it rather affordable for many. The widespread networks of chemist shops and the PHCs make these drugs generally accessible to the people. But there is the issue of affordability to the healthcare in its entirety. In most states of the country

Figure 1: State/UT wise Number of Doctors Possessing Recognised Medical Qualifications (Under I.M.C Act) Registered with State Medical Councils for the years upto 2018



Source: *National Health Profile of India, 2019.*

Figure 2: State/UT Wise Number of Registered Nurses in India



Source: *National Health Profile of India, 2019.*

the population is highly dependent on the private healthcare which is costly. Even with public healthcare facilities, the out of pocket (OOP) expenditure (medical practitioner consultation, medicines, diagnostic tests, room/bed charges, personal medical equipments like thermometers and insulin syringes, transport, expenses of escorts, etc.), both for in-patient and out-patient treatments, is much high at 64 per cent, whereas in the US and EU it is 11.1 per cent and 13.7 per cent

respectively (NITI, 2019). In South Africa it is as low as 7.18 per cent.[4] This high personal expenditure on health has been leading people into debt trap, since health being an essential expenditure people take loans for the same if savings are not there and later fail to repay them; several studies have estimated the percentage of people in India falling into poverty on account of OOP expenditure as from 3.25 to 4 per cent Chowdhury et al., 2020).[5] As Choudhury, *et al* point out this burden is high in the lower quintiles of expenditure. Further, impoverishment on account of OOP expenditure is much more in rural population (8.9 per cent) than in urban population (3.7 per cent) (NITI, 2019).

In India until very recently health insurance had very limited appeal. The Ayushman Bharat initiative has made an inroad into that. The *Pradhan Mantri Jan Aarogya Yojana (PMJAY),* under this initiative provides health cover to 10.74 crore poor and vulnerable families annually upto Rs. 5 lakh per family for hospitalization annually. This is the largest public health insurance programme in the world. It takes care of secondary and tertiary care for a large number of diseases. The scheme provides for cashless treatment. Under the scheme 12,53,63,198 e-cards have been issues since its inception; there are 22,796 hospitals empanelled and 1,08,99,888 hospitalizations (Ayushman Bharat, 2020). The growing population of the country and the changing nature of disease burden are great challenges to the existing infrastructure and human resources to meet the needs even in the normal times. They are already greatly stretched. It is a big challenge for it to measure up to a pandemic crisis of enormous proportions as in the present one.

Healthcare Preparedness for a Viral Pandemic

The second area to be looked into is the preparedness of the system to meet pandemic situations as the one posed by the COVID-19 outbreak. This applies to policy vision and instantaneous policy and strategic interventions and gearing up the system at the shortest possible time to face the emergency squarely.

The National Health Policy 2017 gave special attention to communicable diseases through Integrated Disease Surveillance Programme. It specifically called for action on tuberculosis, control of HIV/AIDS and leprosy elimination. While the policy had not made any specific programmes for viral diseases, except in the context of controlling HIV/AIDS, it did recognise the interrelationship between communicable disease control programmes and strengthening of public health system. This proved to be right in the context of COVD-19 epidemic.

Indian Response to COVID-19 Pandemic

Preparedness is not just a theoretical concept; it has to be a practical one and at the time of an emergency, how it responds matter. The law and policy enabled the government to immediately command all sectors and systems to act with alacrity. The deficiencies in the system, to a great extent, could be mitigated. Within the policy framework, the Government's first action was to use the *Epidemic Diseases Act, 1897*, enacted to tackle the bubonic plague initially, and the *Disaster Management Act, 2005* to make national response to the pandemic mandatory for all to follow. This enabled unified command system at national level and helped central and

state governments to command all systems and departments, even the private sector to control and tackle the epidemic. The government also took a number of short-term and long-term measures to tackle the pandemic. These included proactive, preventive and mitigating measures to contain the spread of the epidemic through travel bans, social distancing and lock-downs, and quarantines of those affected. It also included reverse quarantines of the aged and the vulnerable including those with co-morbidities, and advisories to the people to wear masks and wash hands with soap or sanitisers. The measures also included immediate strengthening of the health infrastructure and facilities through provisions of personal protection equipment, face masks, gloves and ventilators, and creation of quarantine and isolation facilities.

At the same time, the lack of clarity on the way of spreading of the disease was a challenge. The policy makers followed the medical experts without any hesitation in this regard. The Indian Council of Medical Research (ICMR) was the principal adviser. This seemed as the best strategy for the pandemic being one of its kind and without any precedence. The fact that the healthcare system was able to follow one command and one set of guidelines shows the resilience and ability of the system to face an emergency. The shortages were also addressed in novel ways. For example, various non-medical public and private institutions were used for quarantine and isolation facilities. Temporary makeshift hospitals too were set up. For example, in Delhi a 10000-bed facility, one of the world's largest such hospital for COVID-19 patients was set up in short time (Roy, 2020). The manufacturing capabilities of non-pharmaceutical sector were also exploited to overcome the shortages in supply of face masks, gloves, Personal Protection Equipment (PPEs), ventilators, testing kits, etc. The PMJAY insurance scheme had not earlier covered pandemics, but once the epidemic started spreading all over the country COVID-19 hospitalization was also included under it. Such mid-course corrections and adaptation to crisis situations always make the healthcare system capable of meeting unanticipated eventualities.

Apart from immediate short-term measures, the system is also capable of taking up medium-term and long-term measures. These included activisation of research and development (R&D) facilities, including clinical trials towards finding vaccines and medicines for the new disease. The ICMR has got many vaccine candidates. Out of the 140 vaccine aspirants globally 11 are from India. These include COVAXIN being developed jointly by ICMR and Bharat Biotec International, Hyderabad and ZyCov-D by Cadila Healthcare Limited, Ahmadabad. National Institute of Virology, Pune, Centre for Cellular and Molecular Biology, Hyderabad are some of the other research institutions in the forefront in COVID-19 vaccine exploration. Many research institutions and Indian pharmaceutical companies have also entered into R&D collaboration with foreign institutions and firms for COVID-19 vaccine and medicine research.

The preparedness of the healthcare sector was supported by a large number of indigenously developed technologies. The National Research Development Corporation (NRDC) has compiled a list of 127 such technologies. These included

among others, Digital IR Thermometer, Jarvis Thermal Camera, Drone Thermal Screening, COVID-19 Rapid Testing Kits, Rapid Antibody Test, Portable and Rapid Detection Device, Antimicrobial fabric, Low cost 3-D Face Shield, Corona Oven, Smart Stethoscope, Foot Controlled Water Tap, Drone Disinfectant, Bio Body Suits, Electrostatic Disinfection Machine, and so on besides many apps, sanitisers and disinfectants (NRDC, 2020).

A sector which came handy for the situation was the IT sector with its nation-wide infrastructure and frontline digital technologies. In the case of COVID-19, contact tracing is an important containment measure. Pandemic control is to be based on intensive outreach based measures including extensive testing, case identification, isolation, and treatment of infected persons, meticulous contact tracing, home quarantine of contacts, and local lockdowns or restricted movements. The various Apps churned out by digital companies for various state governments and agencies and the *Arogya Setu* of the central government have become very handy in this respect. The telemedicine platform *eSanjeevani* (stay home OPD) developed by Centre for Development of Advanced Computing (C-DAC) has also come handy in the pandemic situation when other patients could not access their healthcare facilities.

India also has rich resources in the AYUSH sector. The infrastructure and human resources in that sector are advantageous for pandemic emergencies. There are 3,966 hospitals and 7,99,879 registered practitioners with the AYUSH systems (Ministry of Ayush, 2020; CDC, 2020).[6] As per Ministry of AYUSH the number of registered practitioners is 13,87,539.[7] The AYUSH system doctors are also available in rural areas and have a larger reach than Allopathy. These systems are also good for general immunity development, with products like *Chyawanprash*. How big a role they played in the fight against COVID will take time to assess, but is likely to be positive.

India's Contribution to the International Response to COVID-19

India has a long history of health sector cooperation with other countries, particularly through South-South Cooperation (SSC), despite its domestic compulsions. This has always been pronounced in the supply of generic drugs to the entire world and India's pro-active roles in WHO programmes like *Gavi*, the Vaccine Alliance (a public–private global health partnership with the goal of increasing access to immunisation in poor countries founded in 2000). As soon as COVID-19 was declared a pandemic by the WHO, India's political leadership initiated action for international cooperation. On 15 March 2020, the Prime Minister held a video conference with SAARC leaders to lay the foundation for the fight against the pandemic in South Asia. This led to the establishment of a SAARC Emergency Response Fund with an initial contribution of USD 10 million from India. This was followed by participation in the virtual conference of G-20 leaders on 26th March, 2020 on COVID-19 epidemic. In April, 2020 India co-sponsored a UN General Assembly Resolution that called for fair, transparent and equitable access to essential medical supplies and any vaccines that may be developed (UNGA, 2020). At Minister and Foreign Secretary

level, the Ministry of External Affairs was also exchanging notes with their counter parts in Indo-Pacific region (Aneja, 2020). On 11 May, 2020, India joined a video conference with the US, Australia, South Korea, Brazil, Japan and Israel to discuss international cooperation in tackling the COVID-19 pandemic. According to External Affairs Minister's tweet, the issues of pandemic response, global health management, and medical cooperation were, *inter alia*, discussed (Scroll, 2020). India stressed the need to ensure access to essential medicines and vaccines at an affordable cost for all countries and called for flexibility in global Intellectual Property Rights (IPR) agreements in the context of the current Pandemic at the World Trade Organisation in May 2020. In the UN Security Council also India stated that it would promote multilateral solutions to the COVID-19 crisis and pitched for reforming multilateralism to reflect the present realities.

In a discussion with the Prime Minister of Laos, on 12 June, 2020, Prime Minister Narendra Modi reiterated the need for international cooperation and for sharing of best practices and experiences, in order to prepare for the post COVID world (PTI, 2020). In his keynote address to the High-Level Segment of the United Nations Economic and Social Council (ECOSOC) on 17 July, 2020, the Prime Minister speaking of India's role in its region as a first responder recalled the support provided by the Indian government and Indian pharma companies for ensuring medicine supplies to different countries and for coordinating a joint response strategy among SAARC countries (PIB, 2020). These have evoked favourable responses from international agencies and organisations like the Shanghai Cooperation Organisation whose members include India, China, Russia, Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan. Secretary General, Mr Vladimir Norov had said that India was playing the role of the 'pharmacy of the world' during the COVID-19 pandemic "with its vast experience and deep knowledge in medicine, setting the tone for many regional and global initiatives" (PTI 2020).

Apart from living upto its international commitments on health, India has provided much needed COVID-care medicines to various countries; 2.8 million Hydroxychloroquine (HCQ) tablets as grant assistance to 25 countries and about 1.9 million tablets of Paracetamol to 31 countries. Further, consignments of Hydroxychloroquine and Paracetamol have been sent to nearly 87 countries on a commercial scale. The recipients include both developed countries like the United States, United Kingdom, Germany, Spain; emerging economy like South Africa; many developing countries in Africa, South America and Asia, apart from the neighbouring countries like Afghanistan, Bangladesh, Bhutan, Maldives, Myanmar and Nepal. India also provided medical teams comprising of doctors, nurses and paramedics to Maldives and Kuwait, besides sending doctors to Nepal at the request of their governments (Chakrabhrathi, 2020).

Future Outlook and Preparedness

While the system has been able to respond promptly in a short-term perspective and draw up many programmes for long-term, there are many lessons to be drawn from the experience, for health

care system. This is especially so since such epidemics or one with different parameters can occur in the future. It is necessary that the health system is always prepared to take up any pandemic situation in areas of health care facilities, medicines and health services. Global Health Security Index 2019 ranked India at 57 out of 195 countries who are parties to the *International Health Regulations, 2005*, in its pandemic preparedness (ability to handle the crisis), though, after the actual experience the top rankers have flopped (GHSI 2019). US was at number one and United Kingdom at number two in the Index, but the general perception now is that both these countries have fared very badly in their responses. Countries like Brazil at number 22 and Italy at number 31 have also not honoured themselves with distinction having high mortality rates to COVID-19. Despite these cases, it is a fact that foundational health system capacities are vital for epidemic and pandemic response, as the Index has observed. This *Index* is the first of its kind and it assesses countries' health security and capabilities across six categories, 34 indicators, and 85 sub-indicators. An ominous observation in the Report is that "countries also face an increased potential threat of accidental or deliberate release of a deadly engineered pathogen, which could cause even greater harm than a naturally occurring pandemic. The same scientific advances that help fight epidemic disease also have allowed pathogens to be engineered or recreated in laboratories."

India needs to strengthen its healthcare infrastructure and enhance the human resources. The *National Health Policy, 2017* (NHP) has laid down the targets. What is needed is financial resources. Low investment in healthcare sector is a major concern. Various committees have recommended increasing public expenditure on health. The target set by NHP is to raise the then level of 1.3 per cent of GDP to 2.5 per cent by 2025. The *Economic Survey 2019-2020* found that the actual public expenditure on health in 2018-19 was only 1.6 per cent of GDP (Government of India, 2020). Considering that most countries have been spending much more on healthcare as a percentage of their GDP this is quite low. For example, even in neighbouring Bhutan it is 3.6 per cent and in Bangladesh it is 2.2 per cent. In Brazil, the GDP share being spent on healthcare is 7.5 per cent. In the rich countries of USA and Japan the percentages are 8.5 and 10.9 respectively. South Korea has been spending around 8.1 per cent of its GDP on health. India will have to speed up the process of enhancing the expenditure on public health, as per the commitment in the National Health Policy.

The infrastructure will have to be made according to global norms and standards. In India, there are 0.53 beds for 1,000 people whereas in neighbouring Bangladesh it is 0.87. In some other countries, the figures as follows: Indonesia 1.1, Chile 2.2, Turkey 2.73, Mexico 1.38, China 4.34, and Russia 8.05 as per a Princeton Centre for Disease Dynamics, Economics & Policy study (CDDEP 2020).[8] India has 7,13,986 beds, 35,699 ICUs, and 17,280 ventilators. For handling pandemic situations, the infrastructure and healthcare products availability with the system will have to be expanded significantly.

Apart from upgrading and expanding health infrastructure, India also needs to strengthen health human resources. Doctors per 1,000 people in India are

0.8, whereas in China it is 2.0, in US 2.6, in UK 2.9, and in Germany 4.3. In rural areas the number of persons served by a government allopathic doctor is 10,926 (Aneja, A. 2020).[9] To achieve doctor patient ratio of 1: 1,000 India needs 2.07 million doctors by 2030.

Any country needs innovation to meet the challenges of new diseases though the system has been responding to the present crisis well. Innovation demands high general science and technology investment by government and R&D investment by both the public and private sectors. India's public expenditure on R&D has been rather stagnant between 0.6 per cent and 0.7 per cent of the GDP over the last two decades. This is well below that of countries like USA at 2.8 per cent, China at 2.1 per cent, South Korea at 4.2 per cent and Israel at 4.3 per cent.[10] India has to build up its capabilities in fundamental and applied research in pharmaceuticals. The pandemic has also pointed to the need for development of affordable healthcare products like personal protection equipment, testing kits, ventilators, inhalers, pulse oximetres, scanners, oxygen concentrates, etc. Indigenous development of medical devices would contribute to promote manufacturing within the country.

Conclusion

The Indian healthcare system has responded fast and well to the pandemic. But system preparedness and capabilities need to be strengthened significantly to avoid panic reactions in the future and to develop public confidence in the system. The country initially had to devote its entire public health care establishment to the epidemic and the private system mostly came under lockdown, practically stopping treatment of other diseases. In a country with multiple and variegated disease burden, such situation will in the long-term lead to other healthcare catastrophes including consequential impact on mental health. The preparedness gaps need to be filled up. Apart from the infrastructure and human resources, the R&D area also will have to be paid more attention than now. Scientific progress will definitely enable humanity to achieve victory over COVID-19 but it will not be the last pandemic. The death toll in a future epidemic will be determined by how well national healthcare systems are prepared to face a global contagion outburst.

Endnotes

1 State of Punjab v. Mohinder Singh Chawla (1997) 2 SCC 83; and State of Punjab v. Ram Labhaya Bagga (1988) 4 SCC 117.

2 Some of the recent outbreaks of infectious diseases in India are Pneumonic plague in Himachal Pradesh in 2002, Bubonic plague in Uttarakhand in 2004, Meningitis in Delhi, Uttar Pradesh and Maharashtra in 2005, Japanese Encephalitis in Uttar Pradesh and Bihar in 2005, Chikungunya in the entire South, Maharashtra, Madhya Pradesh, Gujarat and Andaman & Nicobar Islands in 2006, Dengue in most states in 2006, Swine Flu in Rajasthan, Maharashtra and Gujarat in 2010 and 2015, and Nipah in Kerala in 2018.

3 There are differences with the estimated figure as per Government Rural Health Statistics, probably because all registered are not actually practising.

4 World Bank. https://data.worldbank.org/indicatolar/SH.XPD.OOPC.CH.ZS?most_recent_value_desc=true

5 Also, refer to the following other studies: Selvaraj S, Karan A. 2009. "Deepening health insecurity in India: Evidence from national sample surveys since 1980s". *Econ Polit Wkly* 2009; 44: 55-60; Ghosh S. 2012. "Catastrophic payments and

impoverishment due to out-of pocket health spending". *Econ Polit Wkly* 46: 63-70; Shahrawat R., Rao KD. 2012. "Insured yet vulnerable: Out-of-pocket payments and India's poor". *Health Policy Plan*. 27: 213-21; Berman P., Ahuja R., Bhandari L. 2010. "The impoverishing effect of healthcare payments in India: New methodology and findings". *Econ Polit Wkly,* 45: 65-71.

[6] *Supra* 3.

[7] *Ibid*.

[8] See also, World Bank Data at https://data.worldbank.org/.

[9] *Supra* 3;

[10] World Bank. https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS.

References

Aneja, A. "COVID-19 an opportunity for India's health diplomacy". *The Hindu*. March 27, 2020. Retrieved from https://www.thehindu.com/news/national/news-analysis-covid-19-an-opportunity-for-indias-health-diplomacy/article31178195.ece.

Ayushman Bharat 2020. See Dashboard, Retrieved from https://pmjay.gov.in/. Accessed on 22 July, 2020.

CBHI. 2019. "National Health Profile 2019", *Central Bureau of Health Intelligence 2019*. Retrieved from http://www.cbhidghs.nic.in/showfile.php?lid=1147.

CDC. 2020. "India Factsheet available". *The Centers for Disease Control and Prevention*. Retrieved from www.cdc.gov/globalhealth/countries/india. Accessed on 6 July 2020.

CDDEP. 2020. COVID-19 in India. *The Center For Disease Dynamics, Economics & Policy*. Retrieved from https://cddep.org/covid-19/hospital-capacity-in-india/.

Chakrabhrathi, K. 2020. "Medical diplomacy during COVID19 through South-South Cooperation". *Daily News*. July 13, 2020. Retrieved from http://www.dailynews.lk/2020/07/13/features/223076/medical-diplomacy-during-covid19-through-south-south-cooperation.

Chowdhury, S., Gupta, I., Trivedi, M., & Prinja, S. 2018. "Inequity & burden of out-of-pocket health spending: District level evidences from India". *Indian Journal of Med Res*. 148. August 2018, pp 180-189, Accessed from http://www.ijmr.org.in on July 21, 2020.

Fan, V. and Anand, S., 2016. "The health workforce in India". *World health Organization*. Retrieved from https://www.who.int/hrh/resources/16058health_workforce_India.pdf.

Fullman, N., Yearwood, J., Abay, S. M., Abbafati, C., Abd-Allah, F., Abdela, J., ... & Abraha, H. N. 2018. "Measuring performance on the Healthcare Access and Quality Index for 195 countries and territories and selected subnational locations: a systematic analysis from the Global Burden of Disease Study 2016". *The Lancet*, 391(10136), 2236-2271. Retrieved from https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)30994-2/fulltext#seccestitle190.

GHSI. 2019. "Global Health Security Index". John Hopkins Bloomberg School of Public Health. October 2019. Retrieved from https://www.ghsindex.org/.

Government of India. 2020. *Economic Survey 2019-2020*. Vol. 2. Pp. 275. Retrieved from https://www.indiabudget.gov.in/economicsurvey/doc/echapter_vol2.pdf.

MoHFW. 2019. "Rural Health Statistics 2018-19". *Ministry of Health and Family Welfare*, Government of India. Retrieved from https://main.mohfw.gov.in/sites/default/files/Final%20RHS%202018-19_0.pdf.

Morcha, B. M. versus. Union of India, (AIR 1984 SC 802)

NITI Aayog. 2019. "Health System for a New India: Building Blocks: Potential pathways to reforms", *National Institute for Transforming India*. November 2019. Retrieved from https://niti.gov.in/sites/default/files/2019-11/NitiAayogBook_compressed_1.pdf, p.23.

NRDC. 2020. "Compendium of Indian Technologies for COVID-19". National Research Development Council, New Delhi. April 2020. Retrieved from https://pib.gov.in/PressReleseDetail.aspx?PRID=1621458.

PIB. 2020. "PM delivers keynote address at High-Level Segment of ECOSOC". *Press Information Bureau*. July 17, 2020. Retrieved from https://pib.gov.in/PressReleseDetail.aspx?PRID=1639467.

PTI. 2020. "India 'pharmacy of the world' during COVID-19: Shanghai Cooperation Organisation". *Livemint*. June 22, 2020. Retrieved from https://www.livemint.com/companies/news/india-pharmacy-of-the-world-during-covid-19-shanghai-cooperation-organisation-11592796851895.html.

PTI. 2020. "India, Lao PDR highlight need for global cooperation in post-COVID world". *Deccan Herald*. Retrieved from https://www.deccanherald.com/national/india-lao-pdr-highlight-need-for-global-cooperation-in-post-covid-world-848980.html

Roy, S. 2020. Delhi: 10,000-bed corona centre ready for patients", *Times of India*, June 28, 2020. Retrieved from https://timesofindia.indiatimes.com/city/delhi/10000-bed-corona-centre-ready-for-patients/articleshow/76668104.cms.

Scroll. 2020. Covid-19: India joins US concall with five countries to discuss global cooperation, transparency, *Scroll*, May 12, 2020. Retrieved from https://scroll.in/latest/961732/covid-19-india-joins-us-concall-with-five-countries-to-discuss-global-cooperation-transparency.

UNGA. 2020. "International cooperation to ensure global access to medicines, vaccines and medical equipment to face COVID-19". *United Nations General Assembly Resolution A/RES/74/274*, April 20, 2020. Retrieved from https://undocs.org/en/A/RES/74/274 accessed on 21 July 2020.

WHO. 2016. "Global Strategy on Human Resources for Health Workforce, 2030", World health Organization, Geneva, Retrieved from https://www.who.int/hrh/resources/global_strategy_workforce2030_14_print.pdf?ua=1, pp.93.

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India-Vietnam Partnership in Science and Technology*

Pranay Verma**

Pranay Verma

As part of our Comprehensive Strategic Partnership with Vietnam launched in 2016, science and technology (S&T) has been identified as one of its five pillars. The focus under the Comprehensive Strategic Partnership framework is to diversify our engagement in various areas that are important for our national development. As aspirational societies endowed with youthful demographies, S&T cooperation between India and Vietnam has a crucial role to play in our collaboration and efforts to support each other's national development, of which India and Vietnam have a long tradition. Clearly, S&T cooperation continues to find an important place in the emerging landscape of our engagement.

India and Vietnam have long-existing framework agreement on S&T cooperation. If you review various collaborations that have been undertaken, S&T keeps appearing in its numerous avatars and sectoral focus in those engagements. Of course, we have a framework agreement on S&T, which was signed in 1976 and renewed in 1996, and then there have been several renewals of programmes of cooperation under that arrangement. Under those programmes of action, we have identified a number of specific areas of cooperation and as years have gone by, we have gradually moved into more advanced aspects of S&T. But that's just one dimension of our S&T cooperation, where we have made headways in some areas, but not so much in others.

* Special address delivered by Amb. Pranay Verma during the webinar, 'Promoting India-Vietnam Cooperation in Science, Technology and Innovation (STI): Perspectives and Prospects' co-organised by RIS together with Overseas Office for Science & Technology of Vietnam (VOOST, India) and Vietnam Embassy in New Delhi on Wednesday, 24 June, 2020.

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However, in some specific areas and sectors of our S&T partnership, there have been real success stories. For example, under our engagement in agriculture, which Ambassador Pam Sanh Chau also noted, the establishment of the Cuu Long Rice Research Centre in Can Tho in southern part of Vietnam in 1976 and then the Buffalo and Forage Research Centre in Ho Chi Minh City established in 1978 have been great examples of our early engagements with Vietnam, with a distinct focus on applied S&T as a tool for socio-economic development and as an important part of our bilateral development partnership.

Then came a phase in our partnership where a number of lines of credit from India played a very important role in promoting technology-based sectors of Vietnam, such as railways, textiles, hydropower and steel. These are some fine examples of the usefulness of our development partnership for Vietnam's national development. Some of the current captains, for example, of Vietnam's textile industry are companies which started their industrial journeys benefitting from the Indian lines of credit.

So, I think S&T as a key aspect of our engagement with Vietnam has always been there in our broader engagement. In specific areas, as Ambassador Sanh Chau mentioned in his remarks, our cooperation in peaceful use of outer space through a framework agreement and also the framework agreement on peaceful uses of atomic energy, both concluded in 2016, are two examples that highlight that modern S&T applications remain a priority in our bilateral engagement with Vietnam. In fact, Vietnam was among the first countries with whom India signed an intergovernmental agreement in peaceful uses of atomic energy, much before our civil nuclear agreement with many other countries came up.

In the current phase, apart from these areas of our collaboration where there is a distinct S&T focus, our defence industrial cooperation with Vietnam has also emerged as an important part of our Comprehensive Strategic Partnership. Our defence lines of credit are not just about providing defence supplies to Vietnam of its needs, but they are also about helping Vietnam in producing some of them in Vietnam, which contributes significantly to Vietnam's own manufacturing capabilities. Again, in oil, gas and energy sector, the presence of Indian energy company ONGC, now OVL, in Vietnam since 1980s is an example of how technology has welded our partnership in key sectors. In the new era, we are seeing Indian companies showing interest in investing in Vietnam's renewable energy sector, which is among the emerging areas of our cooperation and which we hope will continue to grow.

We are, therefore, already witnessing the advantage of having an applied, sectoral focus of S&T in our collaborations across wide-ranging verticals. I also believe that such sectoral and applied focus of S&T helps us grow our cooperation in a much more purposive and targeted manner, which we are seeing in some of our key cooperation areas.

Promoting innovation and enhancing capabilities of our enterprises, particularly to enable them to become part of global value chains, should be an important focus as we move forward in our S&T cooperation. I would urge RIS and DST to consider that as an important objective

and purpose of the strategies we propose for our future S&T engagements. Among the potential areas of cooperation, I would say that agriculture should continue to be an area of interest for us. While India has contributed to Vietnam's agricultural development over the years, today there is a lot that we can learn from Vietnam, given Vietnam's own impressive growth in agricultural productivity and Vietnam's success in integrating agriculture research with agricultural production, industry and marketing.

I entirely agree with some of the areas that Ambassador Sanh Chau has identified for our future S&T partnership, such as biotechnology, material science, pharmaceuticals, Industry 4.0. I would also add oceanology. As two great maritime countries, oceanology is an area of interest to both of us. If you look at India's Indo-Pacific Ocean's Initiative (IPOI), which was launched by our Prime Minister at the East Asia Summit in Bangkok last year, there is a big focus among several verticals of IPOI on aspects of S&T where oceanology is at their centre. So, whether it is maritime resources, maritime ecology, maritime capacity building, or maritime S&T, all these areas can be brought under the framework of oceanography and oceanology. We should therefore look at this sector in a more meaningful way.

Healthcare sector is another area that needs to be at the focus of our attention. Particularly now that COVID-19 has posed a new and unprecedented challenge for all of us, I think there is great scope for our scientists to work together – not just in terms of controlling the pandemic, but also in finding a solution for it. Vietnam's success in managing COVID-19 makes it an ideal partner for such collaboration. Application of ICT in healthcare sector as well as pharmaceuticals are also related areas where we are working to promote our cooperation with Vietnam not just as trading partners, but also in building Vietnam's capacities. For example, India has been associated with a telemedicine healthcare project in Vietnam's Hai Phong Medical University under the cooperation framework of IBSA (India, Brazil and South Africa), of which we have received a very positive feedback in terms of the role the project has played during the COVID-19 pandemic. These are examples of a very action-oriented practical cooperation under the rubric of S&T that we should aspire for and promote.

We are closely working with Vietnam in capacity building programmes. Again, there is a broader technology focus in many of them. For example, for our e-ITEC programme that was launched in 2019, we chose Vietnam among a small group of four countries to introduce some new-era S&T courses through remote links. Of course, we have a long-standing partnership with Vietnam under the ITEC cooperation framework. But the e-ITEC programme launched last year, (even though it was the pre-COVID times!), the use of remote links proved to be an excellent medium to reach a target audience using the platforms of online/ distance learning between universities which are centres of excellence on both sides. In this case, IIT Madras from India and Vietnam National University in Hanoi partnered in this e-ITEC programme. The first course covered areas like data analytics, big data etc., which are really cutting-edge subject matters. Similarly, the one thousand post-doctoral fellowships in our IITs for ASEAN students which

was launched recently, we have seen a significant interest and a number of enrolments from the Vietnamese students.

You cannot miss the ICT sector if you are talking about S&T cooperation these days, some of the leading names in Indian IT sector have been present in Vietnam for some time and are building local capacities in areas such as software development etc. Some other Indian IT companies are also exploring new investments in Vietnam. There is increasing attention from Vietnamese provinces in reaching out to us for collaboration in smart city development. That's an area where we have our own focus in India. There may be scope for the two sides to pool in their resources and knowledge in this emerging sector.

Our start-ups also offer us a platform to engage in mutually beneficial cooperation. There is very vibrant start-up community in Vietnam just as we have in India. But I don't yet see much linkages between them. They need to be brought in contact with each other. Some areas where our start-ups could explore cooperation may include Fintech, IT-enabled services, innovation, healthcare applications etc.

In conclusion, I therefore believe that if you start taking stock of the amount of S&T-oriented cooperation that we are share are focused on different technologies, their applications as well capacity building programmes centred on them, you will realise that there is actually so much that we are already doing. At the same time, we still have ample scope for expanding cooperation to newer S&T areas that have a focus in our national development. What we do need to do is to structure them and connect them under a more action-oriented, target-driven and outcome-generating collaboration rubric.

Role of Indian Science Diplomacy in Combating COVID-19

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The COVID-19 has affected 10 million people with nearly half a million deaths worldwide. Scientific terminology like DNA, RNA, polymerase chain reaction (PCR), antibodies, mathematical modeling, concepts of linear, exponential & logarithmic growth, and epidemiological concepts like flattening the curve, physical distancing and herd immunity are trending on prime-time television and social media. People are eagerly hoping for advice and solutions from the health and scientific community rather than the politicians. The COVID-19 outbreak has resulted in scientists from different parts of the world collaborating and working together to combat the pandemic.

However, few world leaders have sealed their borders and taken unilateral actions. The cooperation between governments and international institutions is at an all-time low. Despite friction between international organisations, governments, and global bodies such as the World Health Organization (WHO), the head of the WHO in his recent statement emphasised "The greatest threat we face now is not the virus itself, it's the lack of global solidarity and global leadership" (WHO, 2020). The statement applies to all world powers and encourages them to unite against the current pandemic.

The world can draw quicker and reliable solutions against COVID-19 through openness, transparency, sharing of research data, and international collaborations. Countries should understand the need to revisit, reformulate and re-energise their domestic and foreign

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science and technology (S&T) policies to anticipate transnational risks and exploit opportunities for collaborations. Successful examples from the past may help in understanding how science diplomacy encouraged post-war contact and enabled better relationships between the nations. The European Nuclear Research Laboratory (CERN), International Nuclear Fusion Research and Engineering (ITER), astronomy programmes between USA and Soviet Union, the Antarctic Treaty (1959), SESAME particle accelerator, WHO-led campaign to vaccinate the world's population led to the eradication of smallpox and polio (Sharma & Varshney, 2019). These are some positive examples of science diplomacy and international collaborations (Sharma & Varshney, 2019).

Fortunately, few countries are valuing the importance of science, technology, and innovation (STI) and integrating STI into their foreign policy structure and sharing their scientific data using real-time servers and preprints like bioRxiv, medRxiv, arXiv, Research Square, Preprints.org, OSF, and the WHO Bulletin (ASAPbio, 2020). These servers are a major medium through which scientific articles are being disseminated rapidly and evaluated by the community.

India's responses against COVID-19

India has also taken up strong research programmes to address COVID-19 related challenges, which are primarily focused on research, diagnostics, its management and treatment. The Indian scientific community in close collaboration with industries and start-up companies is engaged in scientific research as well as in the development and production of Personal Protective Equipment (PPEs), rapid diagnostic systems, therapeutics (both vaccines and other medicines), ventilators, disinfectants, anti-viral coatings, informatics (AI based Apps), anxiety and stress management, as well as on repurposing devices and medicines during this period. A number of national research and production projects for researchers in academic and research institutes, start-ups, and private and public companies to provide solutions and new products to combat COVID-19 have been supported by Department of Science and Technology (DST), Department of Biotechnology (DBT), Defence Research and Development Organisation (DRDO), Indian Council of Medical Research (ICMR), Indian Institute of Technologies (IITs), Science and Engineering Research Board (SERB), Technology Development Board (TDB) and Biotechnology Industry Research Assistance Council (BIRAC) (Sharma & Varshney, 2020).

Indian Science Diplomacy Initiatives

The announcement of USD 10 million towards a COVID-19 emergency fund by the Indian Prime Minister and putting together a team of specialists for the SAARC states represent India's positive move towards smooth South Asian integration (The Hindu, 2020). India has used its SAARC COVID-19 Emergency Fund to send drugs, medical supplies and machines to Afghanistan, Bhutan, Bangladesh, Nepal, Maldives, and Sri Lanka. The Indian Prime Minister also participated in the Non-Aligned Movement (NAM) Contact Group in response to the COVID-19 and ensured medical supplies to over 123 partner countries, including 59 members of NAM (Times of India, 2020). India has already supplied anti-malarial

drug hydroxychloroquine (HCQ) and paracetamol to more than 60 coronavirus-hit countries. Apart from SAARC and NAM, Prime Minister Narendra Modi's new stand on strengthening the WHO at the virtual G20 summit and India's presidentship of the World Health Assembly makes India a significant player in structuring post-COVID global economy (Livemint, 2020).

Synergy with National Projects

The Ministry of Science and Technology (MST) and ICMR are working proactively to support the nation's Research & Development (R&D) efforts by engaging with other countries to work together for solution-oriented research to fight COVID-19. DST, India's apex S&T policy agency is helping to connect the Indian scientific community with researchers from other countries like Australia, Brazil, Denmark, Egypt, Israel, Japan, Portugal, Korea, Norway, Russia, Serbia, Singapore, Slovenia, South Africa, United Kingdom, United States, and Vietnam. The Indian and Swedish Prime Ministers agreed on the potential for collaboration and data sharing between Indian and Swedish researchers and scientists, which would also contribute to the global efforts against COVID-19. To connect Indian industries, start-ups, and researchers at the international platform, proposals are under discussion for the development of Industrial R&D projects with VINNOVA (Sweden) and Israel Innovation Authority (Israel). DBT is also working with Sweden on artificial intelligence for advancing the healthcare sector. Some of the actions towards international S&T cooperation taken by the Indian government so far and ongoing negotiations are as follows:

Bilateral Calls

Following the Summit meeting between Indian and Australian Prime Ministers, a special bilateral call on COVID-19 has been launched by DST, DBT and the Department of Industry, Science, Energy, and Resources (DISER), Australian Government for covering fields such as antiviral coatings and other preventive technologies; data analytics, modeling, artificial intelligence applications; screening and diagnostic testing; development of immune-therapeutics; development and testing of vaccines and therapeutics and, viral genomics and bioinformatics under the round 13 of Australia-India Strategic Research Fund (AISRF) (DST, 2020).

Another special call was announced by the Indo-US Science and Technology Forum (IUSSTF) which is a bi-national centre of the DST with the US government. IUSSTF announced a '*Call for Proposals for Indo-U.S. Virtual Networks on COVID-19*' **to encourage** proposals that convincingly demonstrate the benefits and value of the Indo-U.S. partnership to advance research and address critical challenges related to COVID-19 (IIUSTF, 2020). Virtual Networks would allow Indian and U.S. scientists & engineers currently engaged in COVID-related research to carry out joint research activities through a virtual mechanism, leveraging existing infrastructure and funding. These network projects could be of two types: Knowledge R&D networks that enable Indian and U.S. scientists from academia and national laboratories to conduct joint research and public-private virtual networks that enable Indian and U.S. scientists from academia and industry to collaborate on pre-commercial R&D activities having potential towards applied research and

product development. IUSSTF also called for out-of-the-box, innovative ideas from the Indian and USA communities to address the COVID-19 challenge (DST, 2020). Ignition Grant proposals were invited to address proof-of-concept based on sound science and engineering research, the potential for commercial viability and practicality of the idea/ innovation/technology.

S&T solutions against COVID-19 pandemic is one of the research areas for joint R&D collaboration of the DST with the Foundation for Science and Technology (FCT) of the Ministry of Science, Technology, and Higher Education of the Portuguese Republic; the Ministry of Education, Science, and Technological Development (MESTD) of the Republic of Serbia, and the Ministry of Education, Science and Sport of the Republic of Slovenia to develop a new product or repurpose existing equipment under ongoing joint calls of India-Portugal, India-Serbia and India-Slovenia initiatives, in order to boost joint research against the COVID-19 (DST, 2020). Similar calls with other partner countries, who have shown interest, are being negotiated with the purpose of working together and expediting the delivery of possible solutions, new products, and diagnostics.

Collaboration through BRICS Network

A joint R&D call on COVID-19 with Brazil, Russia, India, China, and South Africa (BRICS) has been launched, which will be administered by DST and DBT from the Indian side (DST, 2020). The research areas under this call are covering the following (1) Diagnostics: development of technologies/assays/components for high volume rapid diagnosis; Vaccines and Therapies; (2) developing potential COVID-19 vaccine candidates by various technology platforms including nucleic acid, virus-like particle, peptide, viral vector (replicating and non-replicating), recombinant protein, live attenuated virus and inactivated virus approaches; (3) development of COVID-19 specific animal models (4) Repurposing of Drugs to identify and test existing drugs that might lessen the severity of COVID-19 symptoms; (5) Development of any other intervention/technology related to COVID-19 outbreak prevention and control; and (6) Intervention of artificial intelligence, high-performance computing for COVID-19 across multiplatform ranging from disease surveillance to diagnosis etc. BRICS countries would play a vital role against the COVID-19 with more than 40 percent of the world population and more than 25 percent of the world territory.

European Union

The negotiations with European Union are ongoing for joint collaborative projects on COVID-19 and networking of scientists working on related areas in India and EU. Discussions have been undertaken on the possibilities of collaboration in the fields of technology, research & development, and diagnostics to contain and combat the spread of the pandemic. The possibilities have been explored in the following areas for establishing quick collaboration between India and EU research teams:

- Rapid point-of-care diagnostic tests with increased efforts for enabling front-line health workers to diagnose rapidly and accurately, which will reduce the risk of further spread of the virus.

- New treatments with dual approach to be adopted. Firstly, accelerating the development of new treatments currently in the pipeline (including therapeutic peptides, monoclonal antibodies, and broad-spectrum antivirals), and secondly, screening and identifying molecules that could work against the virus, using advanced modelling and computing techniques.
- Improving epidemiology and public health, including preparedness and response to outbreaks. These projects will help in developing better monitoring systems for effective prevention and control of the spread of the virus, as well as contribute to the assessment of social dynamics.

Technology Exchange

To reinvent the wheel for developing need-based technologies is beyond the scope of most of the third world countries with limited time, money, and resources. India is progressively sharing its readily available technologies to countries that are in urgent need. A *'technology transfer Cell'* is already in place for Ethiopia and Rwanda. Zambia has also shown interest in transfer of technologies from India, including COVID-related technologies.

This process of technology transfer is two way. India has also received offers for technology transfer and its deployment in India from UK, Norway, Singapore, Japan, and Portugal which are being examined by various stakeholders. We are in the process of evaluating, analysing, and further facilitating application of these technologies as per the market demand. Recently a list of at least 30 innovative technologies on COVID-19 from Israeli companies was made available publicly to seek interest from Indian researchers and companies (DST, 2020). It includes preventive kits; diagnostic and decision support systems; technologies for remote monitoring; possible therapeutics; and products related to social and mental aspects.

A few interesting examples from the available list are (1) EarlySense system which provides continuous touch-free monitoring of a patient's heart rate, respiratory rate, and movement, enabling clinical teams to detect and address early signs of deterioration; (2) Wisdo is a mobile app that enables users to share their stories, connect with others who have been through similar experiences, and give and receive helpful advice; (3) Biobeat develops a wearable device for continuous, non-invasive, accurate, medical-grade monitoring of vital signs including blood pressure, oxygen saturation, respiratory rate, heart rate, consciousness, cardiac output, stroke volume, body temperature, steps, and sweat; the Biobeat system also facilitates remote monitoring of patients with a variety of medical issues. Ultimately, this solution allows patients to be treated in their homes. A proposal on tiny iron oxide coated with nanoparticles of silica as an anti-viral coating to fight the corona outbreak is also under consideration.

New possibilities of collaboration

Joint R&D calls are under discussion with UK, France, Japan, South Africa in areas dealing with present challenges of the COVID-19 including, therapeutics, diagnostics, vaccines for viral respiratory diseases as well as Post COVID-19 impact on health and immunity; artificial intelligence, and tools in COVID-19 disaster management; focused algorithms for infectious disease modeling and mathematical modeling of COVID-19 spread.

Proposals on supply chains for therapeutics development, and participation in the international consortium for preparation of draft white paper on Corona Virus Census Collective (CCC), and digital-based platform powered by blockchain technology for collaborative multi-agency disaster response and relief distribution have been received and are under consideration. Refereeing UNESCO's Virtual Ministerial Dialogue on COVID-19 and Open Science, South Africa is also keen for cooperation primarily for reinforcing collaboration with India and commitment to global partnership and solidarity (UNESCO, 2020).

Conclusion

The global crisis provides an opportunity for scientists to communicate with the public and inculcate the scientific temperament among the masses. International scientific cooperation will have mutual benefits to all partners in terms of complementary research, time, capabilities, and resources, resulting in impactful research outcomes that may not be achieved individually. Every nation should realise the need to collaborate and work together by sharing knowledge, responsibilities, work modules, best practices to gain faster and fruitful results. Science relies on openness, transparency, and sharing of required data and information. Processed data is shared in some areas and available in the public domain but, there is a need to share more information concerning socio-economic factors. Science Diplomacy plays an important role to support, and coordinate international cooperation of science, industry, and policy establishments to tackle the current situation and post-COVID impacts.

Apart from the developments of protective equipment, diagnostics kits, and therapeutics; research, manufacturing, and distribution of vaccine to combat COVID is a complex task for a single nation. There are approximately 125 vaccine development programmes going on around the world. Out of these, 10 are in the first phase, 8 in the second phase (animal and limited human trials) and 3 have reached in phase 3 (large scale human trials) (Times of India, 2020). India has a presence in most of these programmes and has already shown its extraordinary capacity for vaccine development, manufacturing, and distribution. It has continued a sustained and regular engagement with Australia, Brazil, Israel, Japan, South Korea, and USA in this direction and is optimistic to play a vital role in making vaccines accessible and affordable world-wide. India's capacity in vaccine and drug manufacturing will play a key role in scaling up availability of these crucial products across the globe. India is also in a position to play an active role towards international cooperation through science and technology in WHO. The Minister of Health & Family Welfare and Science & Technology, India has been elected as the Chair of the World Health Organization's Executive Board for the current one-year term, and India has also been elected as a member of the WHO Executive Board for a three-year term until May 2023. The use of science diplomacy would be an effective tool to bring all the stakeholders across the world at a common platform to combat against any natural or manmade global challenges in future.

References

ASAPbio. 2020. "Preprints and Rapid Communication of COVID-19 research". *ASAPbio*. Retrieved on June 26, 2020 from https://asapbio.org/preprints-and-covid-19

DST 2020. Innovative Israeli Companies with Solutions for COVID19 General List – Healthcare. Retrieved on June 25, 2020 from https://dst.gov.in/sites/default/files/List_for_COVID19.pdf

DST. 2020. Call for Proposals. Retrieved on June 27, 2020 from https://dst.gov.in/call-for-proposals

DST. 2020. Indo-Australia Fund for Scientific and Technological Cooperation (Indo-AISRF) Round 12. Retrieved on June 25, 2020 from https://dst.gov.in/sites/default/files/DST%20AISRF%20Call%20for%20proposals%20for%20website.pdf

DST. 2020. Response to COVID-19 pandemic coordinated call for BRICS multilateral projects 2020. Retrieved from https://dst.gov.in/sites/default/files/BRICS%20COVID-19%20Call%28FINAL%29.pdf

IIUSTF. 2020. Retrieved on June 20, 2020 from https://covid19.iusstf.online/login

Livemint. March 27, 2020. G-20 nations vow to inject $5 tn to fight Covid-19, global slump. Retrieved on July 1, 2020 from https://www.livemint.com/news/india/g-20-members-express-readiness-to-do-whatever-it-takes-to-fight-covid-19-11585236885510.html

Sharma, J., & Varshney, S. 2019. Science Diplomacy and Cooperation in Science and Technology in India. *Science Diplomacy Review*, *1*(2), 11-22.

Sharma, J., & Varshney, S. K. 2019. Mega Science and International Relations: A Case of 'International Nuclear Fusion Research and Engineering (ITER). *Science Diplomacy Review*, *1*(4), 3-13.

Sharma, J., & Varshney, S. K. 2020. India 's S&T Institutions Raise their Game Against COVID-19. April 6, 2020. Press Information Bureau. Delhi. Retrieved on June 20, 2020 from https://pib.gov.in/PressReleasePage.aspx?PRID=1611541

The Hindu. Coronovirus/ SAARC countries unite to combat COVID-19 infections 2020. Retrieved on July 1, 2020 from https://www.thehindu.com/news/international/coronavirus-saarc-countries-unite-to-combat-covid-19-infections/article31397086.ece

Times of India. 2020. 'India to have say in Covid vaccine distribution'. Retrieved on June 27, 2020 from http://timesofindia.indiatimes.com/articleshow/76634738.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

Times of India. PM Modi to address NAM on India's Covid-19 strategy. May 4, 2020. Retrieved on July 1, 2020 from https://timesofindia.indiatimes.com/india/modi-to-address-nam-on-indias-covid-19-strategy/articleshow/75524149.cms

UNESCO. Virtual Ministerial Dialogue on Covid-19 and Open Science. Retrieved on June 25, 2020 from https://en.unesco.org/news/unesco-hosted-virtual-ministerial-dialogue-covid-19-and-open-science

WHO. 2020. "Director-General's opening remarks at the Standing Committee of the Parliamentary Assembly of the Council of Europe (PACE)". 26 June 2020. Retrieved on June 26, 2020 from https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-standing-committee-of-the-parliamentary-assembly-of-the-council-of-europe-(pace)---26-june-2020#:~:text=The%20greatest%20threat%20we%20face,never%20again%20finds%20itself%20unprepared

World Health Organization – Facing the US Withdrawal Challenge

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The COVID-19 pandemic has brought into sharp focus the role of the World Health Organization (WHO) which is the main coordinating agency for health-related matters, including transnational disease outbreaks in the UN system. US President Donald Trump in particular has been harsh on WHO accusing it of complicity with China in covering up the COVID-19 outbreak in its initial stages during December 2019 - February 2020. The US has formally announced its withdrawal from WHO which would be effective from 7 July 2021. This action has unfortunately come at a time when nations are stepping up efforts to fight the COVID-19 pandemic and have moreover agreed on an independent inquiry into the pandemic and the role of the WHO and its member states.[1]

The WHO came into existence in 1948, evolving from earlier organisations set up to coordinate action to deal with disease outbreaks.[2] However, its mandate is broader, covering all aspects of health systems. It is funded by assessed contributions from its member states, as well as voluntary contribution. The US is the largest contributor and has assessed contributions of 22 percent of the regular budget of WHO, amounting to US$ 121 million for 2020. Its dues of assessed contributions for 2019 and prior years were US$ 84 million as on 30 June 2020 (WHO, 2020).[3] The US is just short of two years in arrears of contributions,

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and consequently has not lost the right to vote.

The WHO mobilised some US$ 2.11 billion in voluntary contributions in 2017 (the latest year for which data is available), the US contributions of US$ 401 million, or 40 per cent of a total of US$ 1.04 billion contributed by member states, and US$ 1.07 billion from non-state donors (WHO 2018). The voluntary contributions of leading donor member states (in US$ million) were US (401), UK (164), Germany (90), Japan (46), and Norway (42). Leading non-state donors were Bill and Melinda Gates Foundation (325), GAVI Alliance (134), World Bank (146), European Commission (82). It can be seen that though the WHO has been quite successful in mobilizing voluntary contributions, it is still highly dependent on the US.

The US withdrawal, which has been severely criticised within the US and abroad, will impact some 22 percent of the regular budget of WHO and about 20 percent of its voluntary contributions. The cut in US government voluntary contributions could seriously affect some funded programmes such as outbreaks and crisis responses, and some special programmes and arrangements. It is however unlikely that non-state donors from the US would reduce their contributions following the US withdrawal. Major readjustments will be required, including cuts in programmes, budgets and staff, and member states will have to undertake this difficult exercise in the midst of the COVID-19 pandemic and agree on ways to meet the anticipated financial deficit of WHO, so that it can continue to function. Although US is legally bound to pay its full assessed contributions for 2020 and prior years, and also for 2021, there is no certainty that it would do so.[4] If these payments are not forthcoming it could cause a severe financial crisis for WHO. However, Democratic Party victory in the US Presidential and Congressional elections in November 2020, could result in a reversal of the US decision to withdraw from WHO.

China's share of assessed contributions to the WHO regular budget has risen substantially to 12.01 per cent, in 2020-21 (from 3.91 per cent in 2010-11), compared to the US (22 per cent). The other major contributors (2020-21) are Japan (8.56 per cent), Germany (6.09 per cent), France (4.43 per cent), while India pays only 0.83 per cent in 2020-21 (compared to 0.53 per cent in 2010-11). 86 member states pay 0.01 per cent or less. China has also slightly increased voluntary contributions from US$8.7 million in 2014 to approximately US$10.2 million in 2019, much lower than other major donors. Besides its financial contribution, China's Dr. Margaret Chan (of Hong Kong) was the Director General of WHO for ten years since 2006. The withdrawal of the US would make China the leading contributor to WHO's regular budget (US$ 509 million for 2020) and greatly enhance its role. China would likely seek increased WHO support for projects such as its "Health Silk Road" initiative and block the participation of Taiwan in the WHO. China's growing clout in the WHO can be balanced by other major contributors such as Japan, Germany and France remaining vigilant and acting together.

The Executive Board (EB) met on 4-8 February 2020 (146th session) with its usual agenda largely focused on preparations for the forthcoming WHA. However, the COVID-19 pandemic was discussed at length in the plenary session following the

Director General's address, and member states did not raise any issues about the performance of WHO, or of China's lack of transparency. Perhaps the full dimensions of the pandemic were only being felt by member states. At that time, the outbreak seemed largely confined to Hubei province in China, and perhaps it was felt that it could be confined and controlled. However, by March 2020, the emergence of the COVID-19 into a full-scale pandemic was recognised. WHO held a large 2-day consultative meeting (Global Research Forum) on 11-12 February 2020 in collaboration with the GloPID-R alliance, attended by more than 400 experts and funders from around the world, to coordinate actions aimed at tackling the pandemic. The Scientific Advisory Group of the WHO R&D Blueprint met on 2 March 2020, following which WHO presented a Global Research Roadmap for a robust global research response on the basis of the deliberations during the Global Research Forum (WHO, 2020). This roadmap details various coordinated actions to be taken by all stakeholders.

The World Health Assembly (WHA) met in virtual session on 18 -19 May 2020 (73rd Session) with a truncated agenda. It elected the new member states to be represented on the 34-member Executive Board[5], including India. Australia and over 60 other countries, including the EU and the African Group introduced a resolution calling for an independent and comprehensive evaluation of the lessons learned from the international health response to COVID-19. The resolution was adopted by consensus and was seen as a response to the sharp criticism of China as well as the WHO and its Director General, by the US (WHO, 2020).

Several member states formally raised the issue of participation of Taiwan as an observer, which was strongly rejected by China, but the matter was deferred and would be handled by the WHA when it meets in a resumed session. This issue has been raised each year since May 2017 and rejected in the General Committee, the 27-member steering group of the WHA. Taiwan has been participating as an observer in the WHA each year during 2008 to 2016, but its participation since 2017 has been blocked by China. The US strongly urged the WHO to return to the practice of inviting Taiwan to participate as an Observer to the WHA, and also urged the WHO to systematically engage with Taiwan health experts on COVID-19 and beyond (U.S. Department of Health & Human Services, 2020). It said that the global community must learn from Taiwan's experience from COVID-19 and do more to include them.

The 34-member Executive Board met virtually on 22 May 2020 (147th session) with an abridged agenda. India's Health Minister Dr Harsh Vardhan was elected the Chairman of the Board, to hold office till May 2021. India is poised to play a critical role in fashioning the EBs response to two major issues – the independent inquiry into the response to the COVID-19 pandemic, and the response to the US withdrawal from WHO and its financial and programmatic impact. Both are challenging tasks, adding to the existing challenges of dealing with the COVID-19 pandemic. These challenges will be taken up when the EB meets in its resumed session.

WHO's Director-General on 9 July 2020 announced the setting up of the Independent Panel for Pandemic

Preparedness and Response (IPPR) to evaluate the world's response to the COVID-19 pandemic. The Panel will be co-chaired by former Prime Minister of New Zealand, Helen Clark and former President of Liberia, Ellen Johnson Sirleaf. Operating independently, they will choose other panel members as well as members of an independent secretariat to provide support. Operating procedures for the process will be established in consultation with WHO member states. Countries can propose potential members of the panel. It will be important that the panel is seen to be independent and its review rigorous and credible. The choices of the co-chairs of the commission signals that the process is seen as an issue involving head of state level policy makers. There are suggestions that the committee should have expertise from all relevant domains. The announcement comes after the United States served formal notice of withdrawal from the WHO following a decision announced by President Trump in late May. Joe Biden, the Democratic presidential candidate, has said he will rescind the action if he is elected.

WHO Director General, Dr. Tedros has proposed that meanwhile, WHO can modify its emergency alert tools, to allow WHO to have a system of graded alert responses to public health emergencies of international concern (PHEIC). He had earlier made such a proposal at the Executive Board session in February 2020 to modify the International Health Regulations, 2005. Some experts have supported this proposal to provide more flexibility.

Going forward, a special session of the Executive Board is likely to be called in September to discuss the panel's progress. In November, the panel will present an interim report at the resumed session of the World Health Assembly. In January 2021, the Executive Board will hold its regular session, where the panel's work will be further discussed; and in May 2021 at the 74th session of the World Health Assembly, the panel will present its substantive report. An Independent Oversight and Advisory Committee for the WHO Health Emergencies Programme set up ten years ago, will also continue its existing work.

The international community has shown exemplary solidarity in responding to the COVID-19 challenge. Rapid progress is visible especially in vaccine development, with large number of projects in various stages. Intensive efforts are ongoing in therapeutics (including repurposed drugs), diagnostic kits, medical devices for treatment especially ventilators, and protection equipment. Policy makers have joined the effort, urging the public to observe the key requirements of hygiene, wearing of masks, and social distancing, and cooperation in contact tracing. However, the pandemic shows little sign of decreasing in terms of disease incidence, though European and Far Eastern countries have made considerable progress. The economic impact of the pandemic has been severe, requiring countries to launch stimulus packages to preserve jobs, income and economic growth. WHO can play a key role in many of these areas, provided it overcomes the present challenges it faces.

Endnotes

1. WHO has 194 member states, including 3 non-UN members Lichtenstein, Cook Islands, and Niue; Puerto Rico and Tokelau are associate members.
2. Predecessors of WHO were the International Sanitary Congresses 1851-1938, Pan-American Sanitary Bureau (1902), Office of International Public Hygiene (1907), Health Organization of the League of Nations (1920).
3. The WHO budget is fixed with almost equal share in US dollars and CHF (presently equal to 1.06 US$).
4. In terms of a decision by the US Congress in 1948, the US must pay its dues in full for 2021 and prior years for the withdrawal to be effective. However, in other cases of withdrawal by the US from specialised agencies, it did not pay the arrears.
5. The 34 countries elected to appoint an expert on the Executive Board are (by region) - Africa - Botswana*, Burkina Faso, Gabon, Ghana*, Guinea-Bissau*, Kenya, Madagascar*; Americas - Argentina, Chile, Colombia*, Grenada, Guyana, USA; South East Asia - Bangladesh, India*, Indonesia; Europe - Austria, Finland, Germany, Israel, Romania, Russia*, Tajikistan, UK*.; Eastern Mediterranean - Djibouti, Oman*, Sudan, Tunisia, UAE; Western Pacific - Australia, China, Rep of Korea*, Singapore, Tonga (*Elected in May 2020 for 2020-23). WHO. 2020. 'Members of the Executive Board and Term of Office'. Retrieved from https://apps.who.int/gb/gov/en/composition-of-the-board_en.html.

References

WHO. 2018. 'Voluntary contributions by fund and by contributor, 2017', Seventy-First World Health Assembly. Retrieved from https://www.who.int/about/finances-accountability/funding/A71_INF2-en.pdf.

WHO. 2020. 'US statement of account as on 30 June 2020'. Retrieved from https://www.who.int/about/finances-accountability/funding/account_statement/2020/usa_en_2020.pdf.

WHO. 2020. '2019 novel Coronavirus Global research and innovation forum: Towards a research roadmap'. Retrieved from https://www.who.int/blueprint/priority-diseases/key-action/Roadmap-version-FINAL-for-WEB.pdf.

WHO. 2020. 'Resolution on COVID-19 response, WHA 73rd session'. Retrieved from https://apps.who.int/gb/ebwha/pdf_files/WHA73/A73_R1-en.pdf.

U.S. Department of Health & Human Services. 2020. 'U.S. Statement on Taiwan's Participation at the World Health Assembly, 19 May 2020'. Retrieved from https://www.hhs.gov/about/news/2020/05/19/us-statement-on-taiwan-participation-at-the-world-health-assembly.html.

COVID-19 Pandemic: An African Perspective

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Introduction

Since its outbreak in China in December 2019, Corona virus disease (COVID-19) spread across the world, including Africa. With around 85 per cent of countries affected (WHO, 2020), COVID-19 has passed the threat stage to become a grim reality. As of 21 April, 2020, 15,555 confirmed cases, 795 new infections and 704 deaths have been recorded (WHO, 2020). Contrary to alarming predictions at the start of the pandemic, Africa seems to be doing relatively well, belying experts from developed countries and their forecasts. The numbers of cases in Africa and related deaths, despite its logistical shortcomings are much lower compared to continents like Asia, Europe and America. The table below shows the number of coronavirus cases in Africa.

Most Africans consider the African continent a house with countries as the rooms of this house and the population, a family. Borders for them are merely a fate of their colonial experience. Africa faces innumerable challenges in the field of health as a result, strengthening the health system for universal access to quality healthcare is important. In the past epidemics like malaria, tuberculosis, HIV-AIDS, measles, Ebola have resulted in a significant loss of human life. Africa's response to these health crises has largely relied on international aid and health cooperation under the aegis of the World Health Organization (WHO). Ebola virus outbreak in 2014 saw

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Table 1: Coronavirus Number of Cases in Africa | Daily Update

Date	Total cumulative cases (in % variation D-1	Total cumulative deaths (in % variation D-1	Number of deaths of the day	Cumulative healings
21/06	287 385 (+00%)	7 708 (+00%)	15	132 959
20/06	286 141 (+04%)	7 693 (+04%)	298	132 412
19/06	275 327 (+03%)	7 395 (+03%)	198	125 316
18/06	267 519 (+09%)	7 197 (+06%)	418	122 661
17/06	245 544 (+.3%)	6 779 (+00%)	10	114 897
16/06	251 866 (+04%)	6 769 (+05%)	305	114 308
15/06	242 105 (+04%)	6 464 (+04%)	220	109 977
14/06	232 815 (+03%)	6 244 (+03%)	204	106 459
13/06	225 105 (+04%)	6 040 (+05%)	284	102 846
12/06	216 446 (+03%)	5 756 (+01%)	78	97 068

Source: Coronavirus Statistics, https://www.coronavirus-statistiques.com/stats-continent/coronavirus-nombre-de-cas-afrique/

significant mobilisation of international and African solidarity (the case of the Democratic Republic of Congo to help Liberia) to combat the spread of the disease in West Africa. The effective management of the Ebola epidemic highlights the ability of African countries to efficiently respond and manage disease outbreaks and pandemics.

The present COVID-19 crisis has also seen an unprecedented surge of solidarity among the African countries to manage the pandemic. Numerous measures have been taken by the African Union. In the fight against COVID-19, President of the African Union, Cyril Ramaphosa launched an online platform for essential medical supplies on 17 June 2020. This online platform is designed as a continent-wide portal to allow all African countries to access essential and necessary medical supplies. The President also reassured that the supplies could only be bought by governments and not individuals. In addition, African countries could source supplies in required quantities and at competitive prices directly from the manufacturers. They will also enable integration of the COVID-19 vaccine into the portal, once it is available.

The challenges posed by the outbreak led several instruments to come into play to fight the COVID-19. Immunization, natural lifestyle in Africa and immunity of the population as a result of exposure to previous health crises or epidemics are crucial in understanding the lower rate of coronavirus cases and deaths in Africa. Africa's approach to the COVID-19 outbreak has been largely based on cooperative relations between African states and strong international health cooperation. Science Diplomacy has also played a preponderant role Africa's struggle against COVID-19 pandemic.

Prevention Techniques and Natural Immunization

Numerous techniques for prevention of the spread of the coronavirus have been initiated since the outbreak. These involve raising awareness about various barrier gestures that could restrict and prevent direct or indirect human-to-human transmission of the virus. The production of COVID-19 vaccine against

other pathologies proves to be an indirect prevention against the virus. The African child is inoculated with various vaccines upon birth and during his initial growth years. Some of which continue to have a long-lasting effect in his life (Sylvestre-Treiner, 2020). Since, Africa has seen several waves of epidemics numerous vaccines have been used for prevention in the past.

The available data shows that Africa is the continent least affected by the pandemic. However, limited number of tests and lack of data may have altered the conclusions. It is likely that the numbers of cases are largely underestimated. Certain natural aspects point to an immunization system in Africa is given in table 2.

According to the South African journal, *the Scientist*, several experts point that there is no evidence of the effectiveness of the Bacillus Calmette–Guérin (BCG) vaccine against COVID-19. The *Scientist* noted "administered to children to protect them from tuberculosis for almost a century, BCG has been shown to be effective against other diseases as well, prompting scientists to do more research". Although the BCG vaccine is not intended for COVID-19, the effect of BCG against certain respiratory infections has already been demonstrated. Thus, such reasoning is not devoid of seriousness. According to some studies, BCG vaccinated children are protected against COVID-19 (King, 2020). This hypothesis could provide a lead for the development of the vaccine against

Table 2: Aspects of a Natural Immunization System for Africa

Natural Aspects	Descriptions
Low population density	With 43 inhabitants per square Kilometer, against 181 in Western Europe and 154 in Southeast Asia. The inhabitants are generally concentrated in the capitals, which were very early confined and isolated from other cities.
Less movement of people	Unlike most Western countries, many African regions live in near-self-sufficiency and remain mostly isolated.
A much younger age pyramid	About 60 percent of the African population is under the age of 25. The risk for severe illness from COVID-19 increases with age, with older adults and those with serious underlying medical conditions at highest risk. In France, patients over 75 years of age constituted 75 percent of COVID-19 deaths.
Pre-existing immunity	A preliminary study by the National Health Service (NHS) and King's College shows a correlation between the countries affected by malaria and those affected by COVID-19. This has been explained by a possible protective effect of prophylactic treatments used for malaria such as chloroquine, effective against Coronavirus (Deluzarch, 2020). According to WHO, 93 percent of total malaria cases are recorded in Africa. According to another study, the systematic BCG vaccination deployed in Africa can also explain the immunization of the population.

Source: Author's compilation.

COVID-19. The review also indicates that the work awaiting publication also highlights that countries with widespread TB vaccination have fewer deaths from COVID-19, and vice versa. Countries like Italy or the United States, where BCG vaccination is not compulsory have recorded high death toll because of COVID-19 than Africa (Sylvestre-Treiner, 2020). This, however, is only a positive correlation and has not yet been scientifically proved.

Relations between African Countries: Exchange of experiences

Healthcare diplomacy in Africa

In the case of Ebola virus outbreak, the Democratic Republic of the Congo (DRC) and Sierra Leone shared their response and experience. DRC (a country which has experienced several epidemics) sent its experts to fight the Ebola virus epidemic in other African countries. The COVID-19 outbreak exerted enormous pressure on the health-care infrastructure of most countries and exposed the preparedness of some of the countries with the most sophisticated health systems in the world. These challenges posed by the present crisis can only gravely be addressed by public health actors in Africa due to high poverty rate, urban density, exposure to infectious diseases, limited access to health care and overcrowded makeshift camps in Africa. These present numerous risk factors that threaten to exacerbate the pandemic.

Africa's response to the Coronavirus pandemic has suitably adapted to these difficulties and challenges of resources and assets. Their response has prompted numerous innovations and adaptations in order to better coordinate existing resources and actors to face the COVID-19. In many African countries, 'Task Force' units comprising of health professionals and sectoral experts (epidemiologists, virologists, health Experts public, anthropologists, economists and lawyers) have been set up. The members of these task force units have facilitated exchange of information between African countries on lessons learned and best practices in addressing the challenges posed by the pandemic. The Regional Economic Communities through an accelerated sharing of these lessons has played a key role in this coordination. The COVID-19 Task Force team in South Africa exchanges information through a regional technical committee set up by the Southern African Development Community (SADC), constituting the directors of health institutions and establishments of the Member States. These measures have enabled better understanding of the nature of the pandemic, myths associated and its challenges in African countries. The professional and scientific advice received from eminent African experts, doctors and scientists from recognised institutions and associations, including the African Epidemiology Association and the Royal College of Pathologists, United Kingdom have also helped developing strategies to combat COVID-19.

WHO's Regional Director for Africa, Dr Matshidiso Moeti noted that limited diagnostic capacity was an important challenge for the African continent. Initially, it had only two laboratories capable of diagnosing COVID-19. The countries sent their samples to the Institut Pasteur in Dakar, Senegal and the National

Institute for Communicable Diseases in Johannesburg, South Africa, which also trained other countries. In this context, Africa has witnessed an exchange of expertise, experience and ideas between countries, and the network of health ministers. Dr. Moeti acknowledged the openness in mutual aid between the African countries and underlined that Africa will continue to see this growing solidarity (Pheage, 2017).

Role of Science Diplomacy: Science for Diplomacy

Production and approval of remedies

The discovery of a vaccine against COVID-19 is underway. There are numerous vaccine candidates under different phases of trial across the world. Simultaneously with the vaccines, several local treatments are being undertaken by countries, though some of them are have not yet been scientifically tested. The rapid discovery of a vaccine against the coronavirus was emphasised by numerous speakers during the annual meeting of the World Health Organization (WHO) opened virtually for the first time in the history of the organization on 18 May 2020. In the meantime, several local treatments are being promoted to curb the spread of this virus. The Madagascan president, Andry Rajoelina has been promoting the COVID-Organics, an herbal tea made from artemisia, a plant already used against malaria. However, WHO stresses at the cautious use of these local treatments, highlighting that their effectiveness has not been scientifically proven. Despite these warnings, the Madagascan President continues to promote COVID-Organics, both in his country, and in the rest of the continent. The supplies of the herbal tea are transported to countries like Democratic Republic of Congo, Congo, Egypt, South Africa, Rwanda, Mali, Senegal, Bissau Guinea, Equatorial Guinea and Tanzania.

Several critics point to the lack of scientific evidence regarding the effectiveness of this remedy. The President uses the data from Madagascar which has recorded just over 300 cases for a single death to demonstrate the effectiveness of the remedy. He criticises WHO's reluctance towards COVID-Organics. Marius Comoé, president of the Federation of Associations of active consumers of Ivory Coast also criticises WHO for rejecting the findings of African researchers without any attempt to analyse the findings in depth (Tounkara, 2020). Cameroonian naturopath, Fotsing Linus also stressed that there is more than scientific evidence to take into account. With herbal medicine, clinical observation is crucial. After COVID-Organics is given to the patient, the observations are recorded. Also, artemisia had already proved more effective than chloroquine after centuries of its use. He also claimed that life expectancy is lower in African cities than in villages where only traditional medicine is known. In Cameroon people were mostly treated through traditional medicine, and Europeans arrived in Cameroon only in the 19th century. He added that villages which had no health centers, had a greater life expectancy than cities like Yaoundé, where it ranged between 50 and 70 years.

Opportunities for diplomatic action and international health cooperation

The People's Republic of China where this health crisis started, has now mostly emerged from its own despite, unlike other countries across the world which

are still grappling with the outbreak. China can transform the crisis into an opportunity for scientific action through diplomacy. Africa is a fertile ground and Beijing can affirm that it is aware of the needs of the African continent by playing with its image of being a developed and developing countries. African countries should decide what their needs are and should not allow China to capture their development agenda in the name of aid and investment. China had plundered the resources of Africa under BRI projects.

Africa seems to be at the beginning of the epidemic, when compared with the number of COVID-19 cases and deaths in other continents. Jean-Pierre Cabestan, Professor at the Baptist University of Hong Kong views the present crisis as an ideal shooting window for China as it is trying hard to place itself ahead (Célian Macé, 2020). Solidarity remains central and the primordial asset to face a global health crisis of such magnitude. Our understanding of solidarity comprises of relations, exchanges, collaborations and cooperation between countries. It also gives a preponderant role to Science Diplomacy, especially with regard to epidemiological monitoring.

On the continental level, the Kingdom of Morocco is not to be outdone through material aid as instructed by King Mohammed VI, to fight against the COVID-19 pandemic that benefits 15 African countries, especially the Burkina Faso, Cameroon, Comoros, Congo, Eswatini, Guinea, Guinea-Bissau, Malawi, Mauritania, Niger, Democratic Republic of Congo, Senegal, Tanzania, Chad and Zambia (Kayembe, 2020). These protective products and equipment making up medical aids are made by Moroccan companies and comply with WHO standards.

The aid consists of nearly 8 million masks, 900,000 visors, 600,000 charlottes, 60,000 gowns, 30,000 liters of hydro-alcoholic gel, 75,000 boxes of chloroquine and 15,000 boxes of Azithromycin. However, certain difficulties in international health cooperation can be noted during the present crisis. Even when Africa seems relatively untouched by the virus, WHO is still worried about the increase in the number of infected cases and economic and social consequences of the pandemic in future. WHO fears that Africa could become the next epicenter of COVID-19. International solidarity through international cooperation is essential for the African continent. This cooperation mainly comes in two forms.

First, it takes shape through the International Health Regulations adopted in 1951 during the 4th World Health Assembly and revised in 2005 in order to coordinate the action of the WHO at international level. Secondly, international health cooperation also takes the form of aid distributed by developed countries through bilateral or multilateral agreements. However, this pandemic sees a crisis of multilateralism with negative consequences for international health cooperation. Thus, sustainability of the multilateral system which came up in the aftermath of the Second World War is increasingly being questions and actions strongly criticised. This crisis, initiated by the United States and accentuated by Trump's administration, puts into perspective the power plays on the international scene questioning the development of international health cooperation in a context of the COVID-19 pandemic (Ndiaye, 2020).

WHO aims to limit and fight the spread of infectious diseases worldwide, since health crises often have international impacts. International solidarity in health provides opportunity for nations to work together, exchange experiences, circulate good quality and relatively independent information, propose common directions, common rules, to improve the effectiveness and efficiency of their health actions. WHO can enable international health cooperation and ensure that underdeveloped states and/or those suffering from poor governance are not left behind. Leaving behind poor and underdeveloped states accentuates the risks of these health challenges to reoccur, as certain health challenges are global in nature like COVID-19 (Yves Charpak, 2009).

International health cooperation and SDGs

Good health and well-being is one of the Sustainable Development Goals (SDGs). The objective of third SDG is to 'enable everyone to live in good health and promote the well-being of all at all ages' and make health a prerequisite, an outcome and an indicator for all aspects of sustainable development. Science Diplomacy can play a key role in achieving SDGs. It is imperative to link Science Diplomacy with the actions linked to the SDGs; among others dimensions like Science in Diplomacy, Diplomacy for Science, Science for Diplomacy and finally Science for Sustainable Development.

International cooperation can play a critical role in finding solutions in the fight against COVID-19 and to handle post-covid challenges. In health, as in the other SDGs, momentum of cooperation is helping to reduce the impact of COVID-19, especially in developing countries. However, this momentum will have a wider impact around the world, as various United Nations agencies (WHO, WFP, UNESCO, ILO, OCHA, UNICEF, UNHCR, IOM) are already at work to prepare the world after COVID-19. These UN agencies are trying to provide possible solutions in their respective field of action. To fight the outbreak, Tedros Adhanom Ghebreyesus, Director-General of WHO emphasised that aggressive and targeted tactics through testing, isolating and contact tracing, along with care of each confirmed case. World Food Programme (WFP) prepositioned food stocks to provide at least three months of food aid to vulnerable people in different priority countries. Taking cognizance of the challenges posed in the post-covid world, UN General Secretary, Antonio Guterres, has assured that the recovery from the crisis would not take place on the back of the poorest so that a legion of the new poor is not created (Guterres, 2020).

Conclusion

Since its appearance in Egypt in February 2020, the COVID-19 pandemic has spread to almost all African countries. With around 85 per cent of countries affected, the present pandemic has passed the threat stage and has become a sad reality. In the debates around COVID-19 unlike other continents, Africa seems to be doing well falsifying the catastrophic forecasts for the African continent by the developed nations. International cooperation is integral to challenges like disease outbreaks. COVID-19 pandemic has not spared the African continent. Each country's experience will be unique, but

some issues are common. The experience and lessons derived from countries which were the worst hit by the pandemic has successfully avoided a similar situation in most parts of the African continent. However, aid and solidarity have to be increased considerably to maintain this trajectory. It is in the interest of the whole world to successfully control the spread of the virus in Africa, because as long as he finds refuge somewhere, the world will not be safe. The United Nations must continue to support Africa in its response to the threat posed by COVID-19, in its immediate and longer-term manifestations.

Science Diplomacy plays a key role and will continue to play a significant part in the post-COVID-19 world, when the major world powers will attempt to reclaim Africa through various economic and scientific approaches. The COVID-19 health crisis has certainly revealed several shortcomings for the developed nations and has illustrated the preparedness of the African countries as well as other developing countries. There is a possibility of the reversing of the world order between China and the United States.

Thus, in view of all the above, Africa is preparing for greater scientific autonomy between the nations. It is focusing on promoting the pharmaceutical industry aiming to reduce the continent's drugs dependence on the outside supplies. The strengthening of the pharmaceutical sector will generate exchanges between the countries of the African continent. This marks a great initiative towards a significant preparation in the achievement of the Sustainable Development Goals. The advent of the COVID-19 can be conducive to transformation, and the emergence of a stronger and more resilient Africa, which would be ready to face future pandemics. The lessons learnt from this experience can be utilised in the context of the Decade of Action. African countries can reduce inequality, strengthen health systems, social protection, cohesion and inclusion, revitalise economies and develop new earthquake-proof policies. This will not only require political will, resources and individual and collective commitment from African countries, but also global solidarity.

References

Célian Macé. 2020. "Aid to Africa: hidden diplomatic challenges". *Liberation*. April 15, 2020. Retrieved from https://www.liberation.fr/planete/2020/04/15/aide-a-l-afrique-des-enjeux-diplomatiques-avancent-masques_1785358.

Deluzarch, C. 2020. "Coronavirus in Africa: why the announced disaster did not take place?". *Futura Sciences*. April 23, 2020. Retrieved from https://www.futura-sciences.com/sante/actualites/coronavirus-coronavirus-afrique-catastrophe-annoncee-na-pas-eu-lieu-79699/.

Guterres. A. 2020. "This is, above all, a human crisis that calls for solidarity". UN-Department of Global Communication, COVID-19 Response. Retrieved from https://www.un.org/en/un-coronavirus-communications-team/above-all-human-crisis-calls-solidarity.

Kayembe, A. 2020. "Africa: Covid-19, the DRC on the list of 15 countries receiving aid from Morocco". June 15, 2020. *Zoomeco*. Retrieved from https://zoom-eco.net/a-la-une/afrique-covid-19-la-rdc-sur-la-liste-de-15-pays-beneficiaires-de-laide-du-maroc/.

King, A. 2020. "An Old TB Vaccine Finds New Life in Coronavirus Trials". *The Scientist*. May 4, 2020. Retrieved from https://www.the-scientist.com/news-opinion/an-old-tb-vaccine-finds-new-life-in-coronavirus-trials-67504.

Ndiaye, Sokhna Fatou Kiné. 2020. Covid-19: what place for Africa in international health cooperation?. *Financial Afrik*. May 18, 2020. Retrieved from https://www.financialafrik.com/2020/05/18/covid-19-quelle-place-pour-lafrique-dans-la-cooperation-sanitaire-internationale/.

Pheage, Tefo. 2017. "We can improve health systems in Africa - Dr. Matshidiso Moeti". *Africa Renewal*. December 2016 - March 2017. Retrieved from https://www.un.org/africarenewal/magazine/december-2016-march-2017/we-can-improve-health-systems-africa.

Sylvestre-Treiner, Anna. 2020. "South Africa tests BCG effect against Covid-19". *Courier International*. June 05, 2020. Retrieved from https://www.courrierinternational.com/article/espoir-lafrique-du-sud-teste-leffet-du-bcg-contre-le-covid-19.

Tounkara, Georges Ibrahim. 2020. "WHO critics fail in Africa". *Deutsche Welle*. May 18, 2020. Retrieved from https://www.dw.com/fr/les-critiques-de-loms-passent-mal-en-afrique/a-53488231.

WHO. 2020. "Coronavirus disease 2019 (COVID-19) - Situation Report – 92". *World health Organisation*. April 21, 2020. Retrieved from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200421-sitrep-92-covid-19.pdf?sfvrsn=38e6b06d_8.

Yves Charpak. 2009. "Yves Charpak". *Wikipedia*. Retrieved from https://fr.wikipedia.org/wiki/Yves_Charpak.

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Our challenges in the twenty-first century like climate change, Sustainable Development Goals (SDGs), disease outbreaks including the present pandemic, have scientific dimensions and are largely transnational in nature. Science diplomacy can play a far greater role in dealing with these challenges. Synergism between science and modern diplomacy is not a new, and there has been a long history of scientists supporting international cooperation (Royal Society, 2010; Ruffini, 2017). Since the Cold-War era, scientific organisations have played a crucial role in science diplomacy. The North-Atlantic Treaty Organisation (NATO) was significant in steering discussions between the United States (US) and the Soviet Union on nuclear issues throughout the Cold-War period (Royal Society, 2010).

During the first decade of the present century, the initiatives by US, United Kingdom (UK) and Japan point at a fresh surge in science diplomacy (Royal Society, 2010). The United Nation Conference on Trade and Development's (UNCTAD) Division on Investment, Technology and Enterprise Development too, through its Science and Technology Diplomacy Initiative aimed to promote international S&T cooperation (UN, 2003). Recognising the importance of science diplomacy, professional science associations like the American Association for the Advancement of Science (AAAS) and the Royal Society began focusing on science diplomacy.

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In 2008, AAAS established its Centre for Science Diplomacy to 'strengthen the intellectual foundations for science diplomacy' (AAAS). Science Diplomacy also formed the core of the Royal Society's Science Policy Centre (Royal Society, 2010). Its seminal report with AAAS proposed a three-pronged framework of science diplomacy. However, most initiatives for advancing science diplomacy remain restricted to these professional associations along with, few other governmental, non-governmental organisations, academies, research institutions, network consortiums, etc. Established in 2016, the Science Diplomacy Center (SDC) at the Fletcher School of Law and Diplomacy emerged as one of the first centers solely dedicated to the study and research on science diplomacy in the world.

SDC owes its origin to the foresight and experience of its founding Director, Prof. Paul A. Berkman as a researcher and expert in issues of sustainable development in the polar region. Jean-Christophe Mauduit[1] assisted him in writing and implementing the strategic plan for SDC. Having convened, coordinated and chaired numerous workshops and conferences, including the Antarctic Treaty Summit at Washington DC (2009) and the significant NATO Advanced Research Workshop on Environmental Security (2010), Prof. Berkman underlined the difficulties of convening a dialogue between the NATO countries and Russia through intergovernmental and non-governmental institutions. Science emerged as a tool for diplomacy in convening the first formal shared dialogue on 'common Arctic issues', with emphasis on good governance and informed decision-making for sustainable development in the Arctic (NATO, 2010; Bren School; Scott Polar Research Institute, 2010). SDC is an "unexpected outcome" of the projects aimed at enhancing sustainability in the Arctic, funded by several countries[2] (Isaaffik, 2013). As a part of the Tufts University's Brighter World Campaign, SDC aims at creating inter-disciplinary collaboration for addressing present-day global challenges (Tufts University). It has figured among few universities' initiative towards science diplomacy education (Ittelsen and Mauduit, 2019). Prof. Berkman has published extensively on interdisciplinary themes[3] and have received numerous rewards and recognition for his contributions (Harvard Law School). His article 'The Arctic Science Agreement propels science diplomacy' was published in *Science* (Berkman, 2017).[4] In 2018, NASA Earth Observatory cited SDC's work done in collaboration the Woods Hole Research Center (NASA Earth Observatory, 2018).[5]

The SDC was created at a time when foreign relations and global governance were affected by the geopolitical discord between US and Russia due to conflicts in Ukraine and Syria. Amidst tensions and mistrust, science emerged as the key for furthering cooperation on issues of global commons. Prof. Berkman joined roundtable discussion on US-Russia relations and trade wars. His views were also sought on the US President, Obama's and Canadian PM Trudeau's drilling ban in the Arctic waters, and the impact of Trump's presidency on US-Russia's relations (Pan-Arctic Options, 2016). The potential for Russia-US reset and the first Arctic head of the state summit under Trump's administration was anticipated (Berkman, 2016). The convening of the

International Science Initiative in Moscow by the International Scientific Committee was as an important opportunity for discussing way forward for Russia-US Scientific Cooperation (Pan-Arctic Options, 2017).

Besides its active engagement in US-Russia relations and Arctic diplomacy, SDC aims to develop academic understanding and practical applications of science diplomacy. It undertakes various courses, training programmes and workshop to educate future generation science diplomats. The Center offers a Science Diplomacy course every spring (SDC). SDC has also developed networks with other institutions like Moscow State Institute of International Relations (MGIMO University), and organised joint conferences and student policy workshops (RIAC, 2019).[6] MGIMO-Fletcher series featured among ongoing track 2 communication between US and Russia among academic/education exchanges, reiterating the role of institutions in reducing tensions and defining possibilities of cooperation (Belfer Center for Science and International Relations, 2020).[7] Jointly with Massachusetts Institute of Technology (MIT) and University of Boston, SDC co-organised dissertation workshop for researchers from various disciplines, diplomatic officials and doctoral students working in S&T areas during 2017-2019 (MIT Science Impact Collaborative, 2018; McCormack Graduate School of Policy and Global Studies, 2019). SDC also organised diplomatic training in science diplomacy for the officials of the Ministry of Foreign Affairs in the Republic of Armenia in 2019 (SDC).[8] Since 2019, SDC and the United Nations Institute for Training and Research (UNITAR) have started numerous web-based courses for providing diplomats and foreign ministry officials' knowledge and skills to tackle issues at the intersection of diplomacy and technology (UNITAR).

For building and strengthening a community for science diplomacy, SDC plays a key role in providing leadership in developing and supporting science-diplomacy networks at various levels. The Fletcher Science Diplomacy Club provides a forum for students at Fletcher and beyond, and aims to raise awareness about role of science diplomacy in policymaking, international relations and solving global challenges (ESEP, 2020). It maintains close ties with the Science Diplomacy Education Network (SciDipEd) (Enrique, R. *et al.* 2017; Johnson & Wales University, 2018)[9]. In 2017, the Fletcher School launched the Science Diplomacy Thematic Network to foster international cooperation in maintaining Arctic as a viable and peaceful region. SDC also has collaborations with Science and Technology Diplomatic Circle (S&TDC), Boston. The centre has received endorsements from prominent practitioners such as Mexican Consul General, Emilio Rabasa, who viewed Fletcher School of Diplomacy as the perfect institution for the S&TDC's visit because of its deep engagement in science diplomacy. Similarly, Turkey's Consul General, Ömür Budak noted that SDC was one of his favourite visits (Swissnex, 2017). SDC researchers have been associated with numerous projects, conferences and workshops in science diplomacy. They collaborate with various institutions like Science and Policy Exchange, Quebec; S4D4C[10], other EU institutions, etc. for creating expertise and synergies for knowledge sharing. SDC also aims at collaborating with international

organisations like the International Social Science Council for integrating socio-economic factors in informed decision-making (SDC). SDC research and activities are largely focused on Arctic diplomacy, along with few other peripheral thematic areas like water diplomacy, disaster-risk diplomacy and space diplomacy. Its linkages are mostly with the Global North, primarily institutions and organisations in the European Union (EU), US, Canada, Japan, etc. However, it aims at applying science diplomacy to tackle short-term and long-term global challenges. Therefore, there is immense scope for developing countries to forge links with SDC. It could enable theoretical understanding and practical application of science diplomacy in finding solutions to the challenges faced by developing countries.

For empowering professional diplomats and foreign policy experts, SDC convenes meetings to increase their capacity and capability to address issues that lay at the interface of STI. The US S&T Advisor convened a meeting with S&T advisors of foreign ministers from Japan, New Zealand, UK and US, along with diplomats from twelve countries in Washington. The Fletcher School of Law and Diplomacy, International Institute for Applied Systems Analysis (IIASA), and International Network for Government Science Advice (INGSA) co-organised first high-level International Dialogue on Science and Technology Advice in Foreign Ministries at Vienna in 2016 (Pan-Arctic Options, 2016).[11] Followed by one in Tallories in 2017, with representatives from sixteen countries (Pan-Arctic Options, 2017) After Arctic Science Agreement, University of the Arctic (UArctic), International Arctic Social Sciences Association (IASSA), and SDC coorganised panel dialogue to consider how scientific community could assist effective implementation of the Agreement. Realising the importance of these meetings, SDC started a serial, Science Diplomacy Action (SDA) that published rigorous syntheses of S&T meetings of the government. The Center has published three SDA Syntheses so far (SDC).

SDC views polar regions as critical case studies for approaching various problems and solutions at planetary level (Merighi, 2017). SDC outlook is largely global and it recognises that science diplomacy can play an important role in tackling short-term and long-term global challenges. Though SDC has mostly focused on Arctic diplomacy and its peripheral themes during these transformation times, it aims to broaden the scope of application of science diplomacy to STI related issues. Since the COVID-19 outbreak, SDC and UNITAR have initiated e-learning courses namely, 'Science Diplomacy and Informed Decision during our Global Pandemic' and 'Science Diplomacy and Informed Decision-Making for Life-Long Learning' for diplomats, foreign ministry officials, policy makers and the larger public. It aims to raise awareness in the international community about the challenges that diplomats and international affairs professionals face during the global pandemic and the role science diplomacy could play. SDC organised a webinar to highlight science diplomacy's role in negotiating a global 'Renaissance'.

SDC deals with issues of global commons through 'common-interest' building, informed-decision making, and aims to develop global networks and communication for dealing with the pandemic as well as SDGs. SDC can help in training future generation scientists and

diplomats in understanding science-policy interface in international negotiations, informed decision-making and resolutions as well as tackling disruptions caused by STI, while tackling global challenges and achieving SDGs. Forging linkages and collaboration with SDC will enable a platform to learn from SDC's experience and find solutions to problems unique to India and the Global South through science diplomacy.

Endnotes

1. He was the Associate Director of SDC also the co-founder of the Fletcher Science Diplomacy Club. As a research scholar at AAAS, he worked on issues at the intersection of diplomacy and the space sciences. Dr. Mauduit is currently a lecturer of Science Diplomacy at UCL, London and the Director of the *Journal of Science Policy & Governance*
2. The projects like PAN-Arctic Options and Collaborative Research for Holistic Integration of Arctic Coastal Marine Sustainability, was funded by several countries like the United States, Canada, France, Norway, Russia and China for fostering collaborations among natural and social scientists belonging to diverse organisations in these countries. The project sought to develop lessons of science diplomacy which would stimulate education by and for the benefit of all stakeholders like representatives of academia, industry, government agencies, non-governmental organisations and civil societies.
3. He co-authored books like Baseline of Russian Arctic Law and Informed Decision-making for Sustainability in 2019 and 2020 respectively.
4. The team of scientists led by Prof. Berkman in the article emphasised on its role in cementing consensus and stabilising research platforms among countries beyond political cycles for maintaining Arctic as a zone of peace and cooperation.
5. The mapping of the Arctic shipping patterns showed that the mean centre of shipping activity had moved 300 kms closer to the North Pole. It was a result of efforts of Fletcher's Science Diplomacy Center, Woods Hole Research Center and National Science Foundation (NSF), and was also referred by New York Times in April 2019.
6. The two universities collaborated with other institutions like, the Davis Center for Russian and Eurasian Studies at Harvard University, Carnegie Corporation of New York and the Alexander Gorchacov Public Diplomacy Fund, organised four joint conferences in Medford, Massachusetts and Moscow, Russia between 2017-2019, as well as two joint student policy workshops in Moscow in 2018 and 2019. They aim at identifying differences and fostering mutual understanding among Russian and American scholars and practitioners for bilateral cooperation in areas of shared interests in Russia-US relations.
7. SDC together with RIAC, the International Law Department of MGIMO University, under the Ministry of Foreign Affairs of the Russian Federation coordinated the publication in English of the third volume of RIAC's anthology '*The Arctic: Issues in International Cooperation*', which includes Russia's key Arctic legislation and documents that determine the principles of international cooperation of the Arctic region states.
8. The objective of the course was to train them in the use science diplomacy as a tool for achieving sustainability with the SDGs both at local and global levels.
9. Dr. J. C. Mauduit, and SDC's postdoctoral scholar, Yekatarina Kontar were among the panelists of the SciDipEd workshop, which highlighted the role of young practitioners in building a science diplomacy education community. Dr. Mauduit was also invited by the Biology Colloquium for introducing Science Diplomacy as an emerging field of international relations to students of varied disciplines.

[10] Prof. Berkman is the advisor to S4D4C and was among the signatories of the Madrid Science Diplomacy Declaration.

[11] It brought together diplomats, foreign policy experts from more than twenty nations and several international organisations, to consider the value of an informed decision-making with regard to issues, impacts and resources within, across and beyond national boundaries. The dialogue also shared experiences and best practices in providing scientific advice, highlighted S&T areas which impacted the work of foreign ministers and developed a global network of practitioners.

References

Belfer Center for Science and International Relations, Harvard Kennedy School. 2020. Russia Matters: From Polar Bears to Nuclear Weapons, US and Russia Still Talk. Retrieved on May 27, 2020 from https://www.russiamatters.org/blog/polar-bears-nuclear-weapons-us-and-russia-still-talk-even-if-its-past-each-other

Berkman, P. A. 2016. U.S.-Russia reset and the first Arctic head-of-state summit - Anchorage Daily News. Retrieved on May 27, 2020 from https://www.adn.com/opinions/2016/12/06/u-s-russia-reset-and-the-first-arctic-head-of-state-summit/

Berkman, P. A. et al. 2017. 'The Arctic Science Agreement propels science diplomacy', Science. American Association for the Advancement of Science, Vol. 358, Issue 6363, pp. 596–598. Retrieved on May 27, 2020 from https://science.sciencemag.org/content/358/6363/596

Center for Science Diplomacy. 2018. Agenda: Science Diplomacy 2018 SciDipEd Workshop. AAAS. Retrieved on May 27, 2020 from https://www.aaas.org/events/science-diplomacy-2018-scidiped-workshop

Engaging Scientists & Engineers In Policy (ESEP) Coalition Resource Database. Fletcher Science Diplomacy Club. Retrieved on May 27, 2020 from https://www.science-engage.org/database.html

Enrique, R. et al. 2017. Building a Science Diplomacy Education Community: Perspectives from Young Actors in the Field. AAAS. Retrieved on May 27, 2020 from https://www.aaas.org/sites/default/files/reports/SciDipEd%20-%20Perspectives%20from%20Young%20Actors.pdf

Harvard Law School. Paul Arthur Berkman - PON - Program on Negotiation at Harvard Law School. Retrieved on May 27, 2020 from https://www.pon.harvard.edu/faculty/paul-arthur-berkman/

Isaaffik. 2013. *Collaborative Research: Holistic Integration for Arctic Coastal-Marine Sustainability (HIACMS).* Retrieved on May 27, 2020 from https://www.isaaffik.org/collaborative-research-holistic-integration-arctic-coastal-marine-sustainability-hiacms

Ittelson, P. and Mauduit, J. 2019. 'Science & diplomacy: How countries interact with the Boston innovation ecosystem'. Diplo Foundation. Retrieved on May 27, 2020 from https://www.diplomacy.edu/sites/default/files/Boston_Science_Diplomacy.pdf

Johnson & Wales University. 2018. Biology Colloquium: 'Science Diplomacy- from an old practice to an emerging field of international relations'. Retrieved on May 27, 2020 from https://events.jwu.edu/event/biology_colloquium_science_diplomacy-_from_an_old_practice_to_an_emerging_field_of_international_relations#.Xv3NTigzbIV

McCormack Graduate School of Policy and Global Studies. University of Massachusetts. 2019. Boston Science Diplomacy Dissertation Enhancement Workshop. Retrieved on May 27, 2020 from https://mccormack.umb.edu/special-projects/2019-boston-science-diplomacy-dissertation-enhancement-workshop

Merighi, Matthew. 2017. Sea Control Episode 129 - Science Diplomacy. Centre for International Maritime Security. Retrieved on May 27, 2020 from http://cimsec.org/sea-control-129-science-diplomacy/31304

MIT Science Impact Collaborative. 2018. Boston Science Diplomacy Workshop. Retrieved on May 27, 2020 from https://scienceimpact.mit.edu/2018-boston-science-diplomacy-workshop

NASA Earth Observatory. 2018. Shipping Responds to Arctic Ice Decline. Retrieved on May 27, 2020 from https://earthobservatory.nasa.gov/images/91981/shipping-responds-to-arctic-ice-decline

NATO. 2010. *Advanced Research Workshop on Environmental Security in the Arctic Ocean*. Retrieved on May 27, 2020 from https://canadatogether.hypotheses.org/files/2010/12/NATO-ARW_Summary_Environmental_-Security_in_the_Arctic_-Ocean_15NOV10.pdf. on July 5, 2020

Pan-Arctic Options. 2016. International Dialogue on Science and Technology Advice to Foreign Ministries. Retrieved on May 27, 2020 from https://www.panarcticoptions.org/international-dialogue-on-science-and-technology-advice-to-foreign-ministries/

Pan-Arctic Options. 2016. Paul Berkman discusses the Arctic with PRI's The World. Retrieved on May 27, 2020 from https://www.panarcticoptions.org/listen-paul-berkman-discusses-the-arctic-with-pris-the-world/

Pan-Arctic Options. 2017. Prof. Paul Arthur Berkman interviewed by WCAI. Retrieved on May 27, 2020 from https://www.panarcticoptions.org/prof-paul-arthur-berkman-interviewed-by-wcai/

Pan-Arctic Options. 2017. Talloires Dialogue with the Science and Technology Advisors to Foreign Ministers. Retrieved on May 27, 2020 from https://www.panarcticoptions.org/talloires-dialogue-with-the-science-and-technology-advisors-to-foreign-ministers/

Ruffini, P. B. 2017. Science and Diplomacy: A New Dimension of International Relations. Cham: Springer International Publishing AG.

Russian International Affairs Council (RIAC). 2019. The Arctic: So Close and Yet Still Unknown. Retrieved on May 27, 2020 from https://russiancouncil.ru/en/analytics-and-comments/analytics/the-arctic-so-close-and-yet-still-unknown/

Science Diplomacy Center (SDC). 2017. Vienna Dialogue Team, Science Diplomacy Action Synthesis No. 1, A Global Network of Science and Technology Advice in Foreign Ministries: An Incidental Serial for Rigorous Meeting Syntheses. Retrieved on May 27, 2020 from https://www.ingsa.org/wp-content/uploads/2019/09/Science-Diplomacy-Action-Tufts-Sept-2017.pdf

Science Diplomacy Center (SDC). 2019. Arctic Science Agreement Dialogue Panel Supporting Implementation of the Arctic Science Agreement. Science Diplomacy Action, Synthesis No. 3. Retrieved on May 27, 2020 from https://www.uarctic.org/media/1599347/science-diplomacy-action_synthesis-no-3_arctic-science-agreement-dialogue-panel_supporting-implemention-of-the-arctic-science-agremenet-_31jan19.pdf

Science Diplomacy Center (SDC). Dissertation Workshop. (no date). Retrieved on May 27, 2020 from https://sites.tufts.edu/sciencediplomacy1/event/dissertation-1/

Science Diplomacy Center (SDC). Education at Science Diplomacy Center. Retrieved on May 27, 2020 from https://sites.tufts.edu/sciencediplomacy/education/

Science Diplomacy Center (SDC). Field of Study at Science Diplomacy Center. Retrieved on May 27, 2020 from https://sites.tufts.edu/sciencediplomacy/education/curriculum/field-of-study/

Science Diplomacy Center (SDC). Leadership. Retrieved on May 27, 2020 from https://sites.tufts.edu/sciencediplomacy/leadership/

Science Diplomacy Center (SDC). Science Diplomacy Action. Retrieved on June 1, 2020 from https://sites.tufts.edu/sciencediplomacy/research/publications/science-diplomacy-action/

Science Diplomacy Center (SDC). Synthesis. Retrieved on June 1, 2020 from https://sites.tufts.edu/sciencediplomacy/research/publications/science-diplomacy-action/synthesis/

Scott Polar Research Institute. *2010. SPRI Review.* Scott Polar Research Institute, Cambridge. Retrieved on May 27, 2020 from https://www.spri.cam.ac.uk/about/sprireview/2010/social.html

Swissnex Boston. 2017. Boston's S&T Diplomatic Circle: From the Eyes of the Members. Retrieved on May 27, 2020 from https://yourswissnexboston.org/post/160302925741/bostons-st-diplomatic-circle-from-the-eyes-of

The Bren School. *Professional Researchers: Paul Berkman*. Retrieved on May 25, 2020 from http://www.bren.ucsb.edu/people/Faculty/paul_berkman.html

The Fletcher School. *A History of Excellence.* Retrieved on May 25, 2020 from https://fletcher.tufts.edu/about/history-excellence

The Fletcher School. *Science Diplomacy Interview: Dean James Stavridis with Prof. Paul Arthur Berkman - YouTube*. Retrieved on May 25, 2020 from https://www.youtube.com/watch?v=sXdY4uw5mQc

The National Academies of Sciences, Engineering and Medicine. 'About the Committee on International Security and Arms Control'. Retreived from https://www.nationalacademies.org/cisac/about on July 7, 2020

Royal Society. 2010. New frontiers in science diplomacy: Navigating the changing balance of power. London: The Royal Society, Science Policy Centre.

Tufts University. 2017. Science can align common interests among the world's leading superpowers. EurekAlert Science News, AAAS. Retrieved on May 27, 2020 from https://www.eurekalert.org/pub_releases/2017-11/tu-sca110317.php

Tufts University. STEM Brighter World, Tufts Alumni. Retrieved on May 27, 2020 from https://alumniandfriends.tufts.edu/brighterworld/cause/stem

United Nations. 2003. 'United Nations Conference on Trade and Development: Science and Technology Diplomacy, Concepts and Elements of a Work Programme'. New York and Geneva: United Nations. Retrieved from https://unctad.org/en/docs/itetebmisc5_en.pdf

WCAI. 2018. Can Scientific Cooperation Help Ease Nuclear Tensions? Retrieved on May 27, 2020 from https://www.capeandislands.org/post/can-scientific-cooperation-help-ease-nuclear-tensions#stream/0

REVIEW ARTICLE

Science Diplomacy, Technology and International Relations

Davis, L. S., & Patman, R. G. (2015), ***Science Diplomacy: New Day or False Dawn*****, Singapore: World Scientific Publishing.**

Ruffini, P. B. (2017), ***Science and Diplomacy: A New Dimension of International Relations*****. Cham: Springer International Publishing AG.**

Balakrishnan, B. (2017). ***Technology and International Relations: Challenges for the 21st Century*****. New Delhi: Vij Books India Pvt Ltd & Indian Council of World Affairs.**

Kapil Patil*

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The COVID-19 pandemic has laid bare several faultlines in the international system in putting together an effective global response to the ongoing healthcare crisis. The pandemic has necessitated the transparent sharing of scientific data on the virus as well as on other important parameters to effectively slow down the spread of the virus, to develop biomedical responses, and to compare different measures across regions and socio-political systems (Dall, 2020). The cross-border response to COVID-19, however, have been far less effective owing to the closure of borders and growing fractions both within the government and the international organizations such as the World Health Organization (WHO). Although curbing the spread of virus requires more "scientific, technological and academic collaborations to address common issues", the growing trend of de-globalisation poses a serious challenge and calls for strengthening science diplomacy (Roig, 2020).

At the turn of the 21st century, deepening of the globalisation fostered strong linkages between the science and technology (S&T) communities across the world, which allowed science to play a far greater role in the

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international system. Also, the growing outreach between the communities of science and diplomacy helped to facilitate the emergence of science diplomacy, whereby scientific collaborations among nations were regarded as necessary to tackle increasingly common challenges at the national and international levels (Turekian, 2018). The onset of globalisation broadened the canvass of science diplomacy in a way that countries from the global south began to actively engage in science diplomacy as part of their overall economic diplomacy to reap benefits of globalisation and to use S&T linkages to address various market and systemic failures in their national innovation systems.

Concurrently, there has been an expansion of the growing community of scholars around the world devoted to theoretical and empirical research on understanding why and how different actors leverage science diplomacy to serve both national and global public goods. The current global context marked by the growing trend of de-globalisation and countries turning inwards in pursuit of their national development objectives, reinvention of science diplomacy to address common challenges has assumed far greater importance than ever. In this backdrop, this essay reviews three important works providing comprehensive exposition on conceptual and empirical dimensions of science diplomacy including the voices from the global south.

The ***first book***, "Science Diplomacy: New Day or False Dawn", a volume edited by Lloyd S. Davis and Robert G. Patman holds the honour of being the first-ever comprehensive work on science diplomacy since the publication of Royal Society-AAAS report which brought the term 'science diplomacy' into the global lexicon. The opening chapter of the book outlines the changed global context of the 21st century, which according to authors, provided for strong interactions between S&T communities across borders, and facilitated scientific collaborations among nations by way of science diplomacy. The authors describe 'science diplomacy' as a relatively new term that reflects the fusion of two distinct fields namely "science" and "diplomacy" with diverging epistemological mandates.

For instance, the field of *science* is premised on an evidence-based form of knowledge acquisition, while *diplomacy* is a non-violent approach to the management of international relations, and involves "dialogue, negotiation and compromise". Notwithstanding such diverging prerequisites, the idea of science diplomacy, according to authors, serves the interests of nations -states in the international arena for promoting knowledge acquisition, utilization, and communication. Furthermore, the authors also regard science diplomacy as pursuit of national interests with respect to other states as well as a tool to defuse international tensions.

The relationship between science diplomacy and the international scientific co-operation is an important issue and the authors regard the two as overlapping endeavours, which makes them "related, yet analytically separate". International science cooperation is mainly concerned with the advancement of scientific discovery per se, while the central purpose of science diplomacy is to promote state's foreign policy goals or inter-state interests. International science cooperation, therefore, may or may not encompass science diplomacy.

Based on the three important components of science diplomacy, as presented in the Royal Society-AAAS report namely, "Diplomacy for Science", "Science in Diplomacy", and "Science for Diplomacy", the book provides a detailed analytical discussion on various intervening factors. The first component, *diplomacy for science,* facilitating international cooperation is an important objective, whether in pursuit of top-down strategic priorities for research or bottom-up collaboration between individual scientists and researchers (Royal Society, 2010). Citing the international scientific initiatives such as the International Space Station, the Square Kilometer Array (SKA) project, the International Thermonuclear Experimental Reactor (ITER) and the SESAME synchrotron, the authors contend that cooperation between diplomatic and scientific communities is a principal driver behind diplomacy for science.

The second component "science in diplomacy" refers to the use of S&T inputs in key foreign policy decisions. The function of science in diplomacy, according to authors, should be to ensure effective uptake of high-quality scientific advice by policymakers and equip them to cope with the increasingly complex S&T-related demands of the 21st century. The Intergovernmental Panel on Climate Change (IPCC), in this respect, is an important example of policy-related scientific advice, and "a contemporary illustration of science in diplomacy". The third component namely, 'science for diplomacy' comes in many forms. These include specific features such as 'science cooperation agreements', 'creation of new institutions', 'educational scholarships', 'Track II' diplomacy, & 'science festivals and exhibitions', etc. These events often constitute an effective platform to emphasise the universality and impartiality of science and to highlight common interests.

The authors enrich the conceptualization of science diplomacy by providing a detailed analytical discussion on each component of science diplomacy. The most important contribution of the book, however, is the rich empirical assessment presented for each component of science diplomacy. Among the four case studies under 'diplomacy for science', the first case by Cathleen A. Campbell outlines President Barack Obama's decision to expand S&T engagement with the Muslim world and pinpoints the key lessons of this experience. The second case study by Sarah Macindoe assesses international efforts to manage plant genetic resources for food and agriculture, and whether New Zealand could harness science diplomacy to make a positive impact in this area. The third case study by Gary Wilson deals with Antarctica's critical role in the world's ocean and atmospheric system and argues the need for extending international co-operation to address global warming. Finally, Maria Pozza examines the Square Kilometre Array (SKA) radio telescope project as an example of deepening scientific links between South Africa and Australia and to expand diplomatic links between a developing and developed state.

Under 'Science in Diplomacy' track, the first case study by Manjana Milkoreit explores the case of diplomatic participants in the United Nations Framework Convention on Climate Change (UNFCCC) negotiations to understand how scientific information is received and used by the recipients. Second case study by Sefton Darby draws upon his own high-level professional experience and looks at the

international hydrocarbon and minerals extraction environment in two countries, namely Chad and Azerbaijan and, in particular, considers the relationship between the 'resource curse' and science diplomacy. Third case study by Joan Leach outlines the problems and possibilities for science communication as a form of 'soft power'. Lastly, Daryl Copeland looks at the 2010–2011 WikiLeaks 'Cablegate' affair as a case study of the impact of digital communications technology on contemporary.

The case studies under 'Science for Diplomacy' includes the Jeffrey Boutwell's chapter which explores the impact of the information and communications revolution on three important security issues, namely missile defence, militarization of outer space, and the geopolitics of the Arctic in the era of climate change. The chapter by Edison T. Liu considers global health research as a specific form of science diplomacy which draws upon three examples, namely epidemic research, clinical cancer research and population genetics research which delivers substantial and diplomatic benefits. Stephen Goldson and Peter Gluckman explore how New Zealand uses science to maximise diplomatic impact in seemingly diverse areas such as bio-security and pastoral gas greenhouse emissions. Finally, Atsushi Sunami et al., calls for Japan to play a leading role in S&T diplomacy by being one of the 'critical points' in an expanding global science resource network.

In the end, the authors present a detailed synthetic analysis on the real drivers of science diplomacy including, major problems and issues facing sovereign states which are of global proportions and connected to science and technology. In this context, the authors highlight the paradox that the number of national problems requiring international scientific solutions is rapidly growing, while many sovereign states remain in denial about this and so the international means for addressing these challenges remains weak and incomplete. Discussing the limitations and promise of diplomacy, the authors cite the example of climate change for issues that transcend the boundaries of states, and can only be tackled meaningfully through an international effort.

Two important takeaways from their analysis are as follows. First, science diplomacy cannot be a replacement for other forms of diplomacy that seeks to resolve political issues such as national self-determination, border disputes, or justice for ethnic minorities. Nevertheless, science diplomacy may be a useful complement to diplomacy designed to bridge political differences. Second, the science for diplomacy has had a mixed record especially when science co-operation is the desired outcome. But when diplomatic co-operation is the desired outcome, science has often been less successful in generating positive outcomes. The continuing diplomatic failure to limit emissions causing global warming, strengthen bio-security internationally, and diminish the impact of the so-called resource curse in the oil and mineral sector in a number of countries, all point to this trend.

Overall, the book presents a strong prognosis that science diplomacy is here to stay and its role is likely to grow in future. The book concludes on the optimism that science diplomacy's potential to provide solutions to problems that have hitherto proved intractable for normal diplomacy and political relationships is

real. Although contemporary world order is far from being conducive to exploit its vast potential, science diplomacy is far from being a 'false dawn' and harbours a strong potential to herald a new 'day' or 'order' in the international system.

The ***second book*** by Pierre-Bruno Ruffini entitled, *Science & Diplomacy: A New Dimension of International Relations*, maps the conceptual terrain of science diplomacy by critically examining various definitions, levels of analysis, and disciplinary dichotomies. Combining his rich experience as a Professor of Economics at the Faculty of International Affairs of the University of Le Havre (France) and also as a counsellor for Science and Technology at the Embassy of France in Russia (2007-2010) and in Italy (2010-2013), Ruffini tries to unpack multiple contrasting and complementary features of science diplomacy and provides a comparative perspective on the diversity of national practices and management of international science diplomacy endeavours.

The book begins by critically examining various definitions and ideas associated with science diplomacy and conceptualises it as a 'form of diplomacy of influence'. He analyses the ways in which states have traditionally combined scientific pursuits with various foreign policy objectives, and dives deep into the history to show the longstanding ties between scientific and diplomatic pursuits of states from pre-colonial to the contemporary times. The introductory narrative thus allows the readers to appreciate that the 21st century is not the "birthplace" of science diplomacy and that the synergies have historically existed between science and modern diplomacy.

The author then presents a detailed conceptual discussion on science diplomacy beyond the three-fold categorisation of science diplomacy presented in the Royal Society-AAAS report as discussed in the preceding paragraphs. In mapping the conceptual terrain, the author contrasts epistemological elements of *science* such as "truth", "fairness" and "transparency" with *diplomacy* such as "strategy", "manipulation" and "secret". Notwithstanding such contrasting characteristics, the author neatly identifies elements such as "attraction", "cooperation", and "influence" which are central to national as well as multilateral approaches to science diplomacy, and also common to the disciplinary agendas of international relations and science studies.

The author recognises the prominence acquired by various international R&D and scientific networks across the world, nevertheless, emphasises upon the state as a "sovereign" actor in the international system, and that it is inconceivable to define science diplomacy without a direct relationship with the interest of 'state'. In particular, the author presents a detailed comparative assessment of "diplomacy for science" aspect through a comparative assessment of the diplomatic structures of eleven major countries namely, the United States, United Kingdom, Switzerland, France, Germany, Italy, Canada, Japan China, India, and Russia. The comparative assessment mainly focuses on the differences in the national approaches of individual countries, the design and practise of science diplomacy as well as its governance through distribution of resources. Ruffini examines in detail each national model and presents an assessment of their effectiveness, efficiency, and ideational approach. The comparison throws several interesting insights. For instance, the concept of science diplomacy

is appropriated to varying degrees in various national models and exists more clearly in their political and institutional vocabulary of countries like France, Germany, Japan, the USA and the United Kingdom. The analysis also reveals diverse goals and priorities. For instance, Switzerland is more focussed on issues such as education while Canada is more focussed on commercial cooperation and working on the intersection of innovative diplomacy. The French science diplomacy is more enveloped in the traditions of cultural diplomacy; the U.S. as a pioneer in S&T cooperation while Russia making use of its traditional S&T prowess to advance its national interests. Among the newcomers such as India and China, the latter is clearly leading the way by forging innovation partnerships; for creating new markets and to emerge as a leader in innovation. Chinese innovation diplomacy model is producing new vistas and it has drawn the attention of the rival countries to sustain their lead in global innovation race.

The analysis then turns to the "science for diplomacy" component and presents several examples of how the foreign policy of a country can put forward science and scientific cooperation to achieve its goals. The book also deepens the vanguard role of science in the formation of non-national areas through examples of European Union and the Polar Regions. Ruffini presents certain important examples related to science diplomacy - CERN (the European Organization for Nuclear Research), and SESAME (Synchrotron Light for Experimental Science and Application in the Middle East),

In the context of theoretical framework and practical implementation of science diplomacy, Ruffini asserts that the three main components that drive state's foreign policy are attraction, cooperation, and influence. This is due to the perception that utilising science through these approaches might allow a state to gain power. Underlining each of these components, Ruffini suggests a general model for implementing science diplomacy within the foreign policy. The potential of science diplomacy as smart power might also have a positive influence on 'brain gain' and 'brain circulation' in order to prevent 'brain drain', which the author outlines is particularly an issue for states such as Italy and Russia.

The last part of the book discusses the issues of multilateral diplomacy. Taking the case of climate negotiations as an example of multilateral diplomacy, the author shows peculiar hybridization of science and diplomacy in climate diplomacy, which constitutes a strong illustration of the "science in diplomacy" aspect. The author mentions that the necessity of multifaceted collaboration in such projects is essential for the sake of progressive scientific development and for strengthening state influence at both regional and global levels. Finally, the author addresses certain key disciplinary concerns about science diplomacy such as its scope, effectiveness, and how much does science help diplomacy. The author underlines that the strength of mutual interests gives science diplomacy its best chance to be a sustainable practice.

The ***third book***, "Technology and International Relations: Challenges for the 21st Century" by Ambassador Bhaskar Balakrishnan presents a comprehensive account of wide-ranging S&T issues that have become the subject of international negotiations over the years. With science, technology, and diplomacy becoming more closely intertwined due to the expansion

of human knowledge, according to the author, the countries that take advantage of this trend are likely to stay ahead in the international technology race. The book draws upon Ambassador Balakrishnan's academic background as a theoretical physicist as well as his rich experience of dealing with S&T issues as a career diplomat.

Throughout the narrative, the author raises several important questions on the relationship between science, society, and contemporary international relations and its implications for domestic and foreign policies of countries from the global south. The book contains seventeen detailed chapters which can be broadly divided under four broad themes. The first three chapters deal with S&T issues in the historical, global, and national contexts. Starting from the historical evolution of S&T in the human civilisation, first chapter analyses how breakthroughs have contributed to economic and military dominance of countries and regions around the world.

The second chapter covers technological developments in the 20th century especially during world war and post-war years. While much of technological dynamism throughout the 20th century was primarily influenced by wartime requirements, the author rightly points to concerns over deepening technological divide between developed and developing countries in the 1960s and 70s, which heralded the era of north-south and south-south cooperation and played an important role in shaping the international S&T agenda in the latter part of 20th century. The third chapter maps S&T developments in India's domestic foreign policy context. These chapters thus set a useful background for understanding the global S&T context and its linkages with India's national development.

In the second thematic group of chapters (four to ten), the author examines seven technological sectors such as, nuclear technology, chemical technology, biotechnology, information and communication technology, aerospace technology, ocean space and nanotechnology. In these chapters, the author mainly discusses key technological developments as well as a range of legal, regulatory, and industrial policy issues in specific international treaties and conventions in each sector. The discussion is deeply insightful and outlines specific issues for shaping domestic technological policies as well as to shape negotiation strategies in various international forums and meetings. For instance, the rapid advances in certain technological fields such as artificial intelligence, cyber systems, biotechnology, etc pose a complex challenge for diplomacy and it is imperative for catching-up countries to improve their payoffs through engaging experts and consultants.

The third thematic group of chapters (eleven to fourteen) deals with 'grand challenges' such as climate change and human health facing the society in the 21st century, as key contested issues in global technology governance. These challenges are crucial for not only shaping the country's strategies and positions in the international forums, but also play an important role in influencing the development of new and emerging technologies that are sustainable and human friendly. In a similar vein, chapter thirteen and fourteen focuses on issues of intellectual property rights (IPRs) and technology control regimes, which are not only contested issues in global governance

but also pose serious ramifications for shaping national technological trajectories and determining global technology flows.

Throughout these chapters, the author draws several important generalisations about the emerging technological trends and highlights the areas where the strengthening of national diplomacy is required for developing countries. For instance, the author refers to several important international treaties and conventions in the areas of space, ocean, chemical weapons, climates change, and rightly observes the under-preparedness among the Indian diplomats on specific S&T issues, while scientists being blissfully unaware of the international ramifications of their actions affecting national interests.

The last two chapters of the book, chapter fifteen and sixteen dwells on the aspects of international cooperation and science diplomacy for addressing various national and global challenges. Talking about international scientific cooperation, the author raises an important issue to ponder, "Can science brings us together?" The author also rightly cites India's participation in many international science programmes such as Centre for European Nuclear Research (CERN) in Geneva, International Thermonuclear Experimental Reactor (ITER) in France as examples of India's growing S&T outreach.

One of the central messages that the author conveys through the book is that science and technology are likely to play an increasing role in diplomacy and international relations, and countries must be prepared to deal with their impact on foreign and economic policies in future. The prognosis offered by the author on various technological trends and the need for strengthening science diplomacy capacities is of immense value for the country across the global south. For instance, two decades ago, India missed the technological bus on electronics and ICT technology revolution and currently suffers from huge electronics import bill and that has surpassed the oil imports. In view of such lapses, strengthening of national science diplomacy capacities and promoting dialogue and interactions between diplomats and scientists to devise initiatives is of paramount importance.

The three-books reviewed in this essay are crucial for understanding and outlining the extant "state of the art" on global science diplomacy. Such review is essential not only to understand conceptual and policy-oriented discussions on science diplomacy, but also to find the space for developing further conceptualisation. In this context, the ongoing COVID-19 pandemic has afforded important opportunity to theorise new policy interventions and to critically examine the manner in which science diplomacy has heralded a much-promised "new day" to address common problems facing the humankind.

References

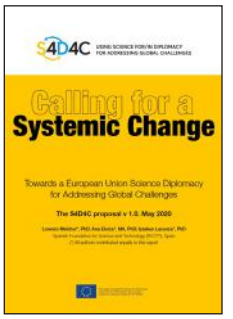
Dall, E. 2020. "What everyone is talking about: COVID-19 (and science diplomacy?)". *S4D4C*. Retrieved from https://www.s4d4c.eu/what-everyone-is-talking-about-covid-19-and-science-diplomacy/

Roig, A. 2020. "Science Diplomacy against the Pandemic". *INGSA*. March 30, 2020. Retrieved from https://www.ingsa.org/covidtag/covid-19-commentary/scitech-webinar-1/

The Royal Society. 2010. "New frontiers in science diplomacy: navigating the changing balance of power". *RS Policy document 01/10*.

Turekian, V. 2018. "The evolution of science diplomacy". *Global Policy*, 9, pp. 5-7.

S4D4C Policy Report: Calling for a Systemic Change - Towards a European Union Science Diplomacy for Addressing Global Challenges



Sneha Sinha*

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The COVID-19 outbreak, climate change, poverty, inequality, environmental degradation, peace and justice are some of the complex, interdependent and transnational challenges facing the world today. Amidst the pandemic, the Sustainable Development Goals (SDGs), which seek to address the aforementioned global challenges, needs a multilateral and internationally coordinated response. Science, Technology and Innovation (STI) lay at the core of addressing these challenges and require effective partnerships between scientists, policymakers and diplomats in finding relevant solutions. The European Union (EU), in particular, has acknowledged the role that science diplomacy can play in promoting EU's foreign policy goals as well as in upholding its commitment to SDGs and development cooperation to address the global challenges. Science diplomacy is also increasingly adopted as a useful tool by many governmental and non-governmental organisations in both developed and developing countries.

One such endeavour is the Horizon 2020 funded consortium - science for/in diplomacy for addressing global challenges (S4D4C). Initiated in 2018, the first global networking meeting of S4D4C was held in Madrid, which brought together science diplomacy scholars and practitioners from all over the world and explored the potential of EU's science diplomacy in advancing national needs, cross-border linkages and global concerns.

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The Madrid Declaration outlines the vision, principles and potential of EU's Science Diplomacy. It views science diplomacy as a fundamental and universal tool to improve international relations. It seeks to integrate science into EU's foreign policy, and science diplomacy to achieve common objectives like SDGs through effective alignment of interests and efficient coordination of resources. S4D4C's 2nd meeting with mostly European members in 2019 held in Berlin, put together recommendations for various stakeholders after identifying the drivers, barriers and challenges in drawing a European Science Diplomacy Roadmap. The dynamics of current conceptual understanding of science diplomacy, distinct national interests, and approaches of different countries; individual political agendas of member states; local and national contexts, and challenges in transnational efforts while tackling global problems - were identified as some of the challenges in building up an EU science diplomacy strategy. In this backdrop, this essay reviews one of the recent policy report published by S4D4C.

The report comes at a time when science diplomacy has assumed far greater importance with the commencing of the decade of action for the SDGs, and especially when the world is dealing with the spread of COVID-19 pandemic. Drawing from the S4D4C networking meetings, Spanish Foundation for Science and Technology (FECYT), one of the partner institutions of the S4D4C consortium on 9th May 2020 published the policy report 'Calling for a Systemic Change: Towards a European Union Science Diplomacy for Addressing Global Challenges'. The report is co-authored by Lorenzo Melchor, Ana Elorza and Izaskun Lacunza currently working at FECYT. The authors acknowledge the contributions of others, most of whom were signatories of the Madrid Declaration, along with few other S4D4C members and attendees of its 2nd networking meeting. The policy report is a proposal for EU science diplomacy to support EU's wider policy objectives for addressing global challenges. It contains five chapters which can be broadly divided into three main sections. The first section underlines the vision, mission and principles of the EU science diplomacy for addressing global challenges. Second, identifies the main stoppers, warnings and drivers within the systems of science, diplomacy, and science diplomacy, primarily taking stock of 'where are we?'. The last section tries to answer 'how can we get there?' through a set of policy recommendations focused on an integrative transformation for a systemic change towards EU science diplomacy for addressing global challenges.

In the first chapter, authors highlight the role of S4D4C in nurturing an EU science diplomacy community through its activities and series of networking meetings. Drawing from their deliberations, the report underlines its aims to stir public and policy debate around an EU science diplomacy strategy to address global challenges within the EU science diplomacy community (including, European Commission, European External Action Service (EEAS), Member states, and the scientific and diplomatic communities).

Deriving inspiration from the Madrid Declaration, the second chapter states the vision, mission and principles of the EU science diplomacy. EU's vision for addressing global challenges envisages systemic changes to foster the union of EU science and EU diplomacy for formulating integrated and mission-oriented policies.

EU's mission reinforces its position as a global leader. As it seeks to strengthen linkages and communication between stakeholders for co-designing policies to better address global challenges, as well as coordinate and align EU and member states towards an evidence-informed foreign policy. As a tool for addressing global challenges and for improving international relationships, EU acknowledges the importance of the independence of science along with other principles presented in the Madrid Declaration.

Having defined EU's vision and mission, the third chapter analyses the stoppers, warnings, and drivers of EU Science Diplomacy to address global challenges. The emphasis on the meta-governance framework evident in earlier policy briefs published by S4D4C experts is reiterated. The framework can overcome the problem of heterogeneity in defining science diplomacy and maximise synergies between member states and the EU, also preserving specialisms and expertise of science diplomacy actors (Aukes, Ordonez Matamoros and Kuhlmann, 2019). The four premises for developing effective science diplomacy mechanism include, (i) grand societal challenges require both diplomatic efforts and science-based knowledge; (ii) science-based knowledge production is diverse and evolving; (iii) diplomacy means reconciling a variety of interests, and (iv) science diplomacy requires combined science and diplomacy literacy (Aukes, Ordóñez-Matamoros and Kuhlmann, 2019). These premises lay at the core of the recommendations provided in the present report. It is imperative to understand what processes may block, challenge, or drive science diplomacy efforts. Therefore, the report identifies stoppers, warnings and drivers for evolving a joint EU science diplomacy strategy for addressing societal and global concerns. The nature of institutions and lack of coordination in governmental institutions were identified as primary stoppers for addressing global challenges using science diplomacy. The warnings include, difference in cultures, heterogeneity in understanding of science diplomacy, nature of leadership and an imbalance between competition and collaboration. However, the report identified EU's leadership in SDGs and climate emergency, its regional and global charters and focus on training and capacity building of scientific and diplomatic communities as important drivers for tackling global issues using science diplomacy.

Achieving SDGs require knowledge-based and innovation-led sustainable growth. Agenda 2030 provides an opportunity for profound economic and societal transformations. The complexities, including array of stakeholders and institutions involved, with varied interests impedes a holistic response. An in-depth understanding of the scientific and the geopolitical dimension of the challenges is necessary, as these cannot be handled solely by the scientific community or the diplomats. Thus, "transformative science" and a "knowledge-based diplomacy" are crucial (Aukes, Ordóñez-Matamoros and Kuhlmann, 2019). Recognising these, the authors in the fourth chapter propose a new approach for triggering a systemic change in the EU governance of science, diplomacy, and science diplomacy that aligns and maximises the impact of each stakeholders' effort to tackle global challenges. The report has come up with a set of recommendations for an integrative transformation taking note of three transversal processes (learning

system, integrative leadership and change of culture) in five specific key spheres (knowledge, governance with no silos, alliances, institution, and people). Some of these recommendations have already been proposed previously by scholars and practitioners. The report aims to raise awareness about these spheres and their interactions to encourage stakeholders advancing their knowledge, forge alliances between institutions and research networks, and drive citizen engagement to contribute effectively to global challenges. Knowledge-sharing between stakeholders and trans-disciplinary/multi-disciplinary solution-oriented approach lay at the core of STI for SDGs. It also presses for capacity building of scientists and diplomats and calls for universities and research centres to evolve their strategies around SDGs.

The policy report recommends a collective, committed and integrative EU leadership and advocates for a collaborative action by all stakeholders, institutions and member states for the proposed systemic change to use science diplomacy in dealing with global challenges. Recognising the decade of action, the report proposes significant recommendations largely focusing on STI for SDGs. The report, however, does not draw implementation plans or strategies for the proposed recommendations. It adequately analyses the stoppers, warning and drivers in science diplomacy for addressing global challenges. The warnings identified in the report help us to know main risks or consequences of the policy suggestions and understand how they could be mitigated. It certainly broadens our understanding of various challenges, risks involved in practicing science diplomacy to achieve a balance between competition and collaboration. Taking account of the present crisis, it would also be interesting to know how these policy recommendations could help in addressing other short-term to long-term global challenges like disease outbreaks, climate change, global 'commons', etc. The present crisis sufficiently highlights the shortcomings in interactions between international relations and science cooperation, and underlines the widening scope of science diplomacy practices for addressing global challenge more effectively. Since, the authors of the report view it as a live document and call for ideas on the implementation of the recommendations for the EU and other important stakeholders, it would be interesting to understand the impact of COVID-19 and post-COVID transformations on short-term and long-term challenges as well as SDGs.

References

Aukes, Ewert J., Gonzalo Ordóñez-Matamoros, Stefan Kuhlmann, and Sanaz Honarmand Ebrahimi. 2020. Towards Effective Science Diplomacy Practice. Policy Brief. Vienna: S4D4C. Retrieved from https://www.s4d4c.eu/wp-content/uploads/2020/01/S4D4C-Towards-effective-science-diplomacy-practice.pdf.

Aukes, Ewert J., Gonzalo Ordonez Matamoros, and Stefan Kuhlmann. 2019. Meta-Governance for Science Diplomacy - towards a European Framework. Twente: Universiteit Twente - Department of Science, Technology and Policy Studies (STePS). Retrieved from https://doi.org/10.3990/4.2589-2169.2019.01.

Flink, Tim. 2018. Science Diplomacy in the European Union: Practices and Prospects. Vienna: S4D4C. Retrieved from https://www.s4d4c.eu/wp-content/uploads/2018/11/S4D4C-Policy-brief-Flink-and-Rungius-2018-Science-Diplomacy-in-the-European-Union.pdf.

Science Diplomacy Events

Workshop on India-Japan Science, Technology and Innovation (STI) Partnership for Sustainable Development

The Office of Principal Scientific Adviser, Government of India; Cabinet Office of the Government of Japan and RIS co-organised a virtual workshop on 'Developing STI Partnerships for Sustainable Development: Accelerating International Cooperation and Actions through the Global Pilot Programme on STI for SDGs Roadmaps'. The two-day workshop was held on 23 June 2020 and 29 June 2020. On the first day, the webinar highlighted the long history of collaboration between India and Japan, and significance of STI cooperation between the two countries for achieving Sustainable Development Goals (SDGs). On the second day, the focus was primarily on accelerating global pilot programme for STI and SDGs roadmaps to promote inclusive growth by key stakeholder countries.

The webinar on the first day reiterated the need for intensive scaling-up of STI partnerships and human resource exchange between the two countries to build resilient systems for attaining national SDG targets and contribute towards supplying global goods, avoiding supply change disruptions. The scientific community is central to cultivation of scientific communication and awareness for greater understanding of the impact of S&T interventions. The panelists from India and Japan belonged to government departments/ministries, S&T institutions, think-tanks and private sector. They identified numerous sectors for synergising collaborations and emphasised on a technology-led innovation for cost-effective, affordable and accessible solutions to achieve SDGs namely, frontier technologies like artificial intelligence, cyber systems, big-data, digital technology, blue economy, sustainable agriculture, biodiversity, green mobility, waste-to-wealth, water conservation, CHG mitigation, soil sequestration, climate impact assessment, energy transition, healthcare, etc. Strengthening national S&T endeavours in India and Japan lay at the core of helping other developing countries to work towards implementation of SDGs. This aspect was covered during a webinar with pilot countries and institutions like the World Bank, UN on 29 June 2020.

Workshop on Accelerating International Cooperation through Global Pilot Programme on STI for SDGs Roadmaps

On the second day of the workshop, delegates from five pilot countries namely, Ghana, Ethiopia, Kenya, India and Serbia together with those from Japan, the World Bank, UN-DESA and UN-IATT, etc. were present. The webinar underlined the importance of leveraging respective strength in STI for achieving SDGs, through multilateralism and building global partnerships. The formulation of STI for SDGs roadmaps requires finding sustainable solutions through technology, without widening inequalities and providing low-cost energy access to the Global South. The three key pillars of STI partnerships include, building national STI capability, boosting international STI flows and brokering STI coalition. Technology mapping with sectoral indicators, engagement with pilot countries and technology facilitation mechanism are critical pathways for SDGs.

The pilot countries gave an account of their national initiatives in achieving SDGs. Since digital convergence is identified as a powerful tool to deliver SDGs, India has launched various initiatives to harness digital technologies for achieving inclusive growth and development. Ghana's roadmap for STI for SDGs includes building local capacities along with high-level engagement with international partners. Kenya has undertaken various national pilot projects and aims at leveraging regional and international partnerships to improve STI for SDGs governance. Ethiopia's roadmap involves identifying priority sectors and aligning its STI policies with the national development strategies for achieving SDGs. In the multilateral arena, emphasis was on innovation which is socially cohesive, inclusive and sustainable. In the wake of the COVID-19 crisis, healthcare should be the focus for STI for SDGs. Greater emphasis on global commitment, scientific collaborations and improving science-policy interface was called for. The strengthening of national R&D systems also requires integrating both private and public sector, and promoting knowledge sharing through international engagements for successful implementation. Synergistic progress with multi-stakeholder involvement across all SDGs is critical for Agenda 2030. STI partnerships for SDGs need an enabling environment, incentivisation of research, reorientation of international development priorities and synergy between evidence-based knowledge and policy formulation.

Webinar on India-Vietnam Cooperation in STI

RIS together with Overseas Office for Science & Technology of Vietnam (VOOST, India) and Vietnam Embassy in New Delhi organised a webinar, 'Promoting India-Vietnam Cooperation in Science, Technology and Innovation (STI): Perspectives and Prospects' on Wednesday, 24 June 2020. The webinar was co-chaired by H.E. Mr Pham Sanh Chau, Ambassador of Vietnam to India and Mr Pranay Verma, Ambassador of India to Vietnam. The panellists included Dr Sanjeev Kumar Varshney, Head & Advisor, International Bilateral Cooperation Division (IBCD), Ministry of Science and Technology, India; Prof. Le Van Toan, Chairman of Scientific Council, Center for Indian Studies; Mr Arvind Gupta, Founder iSPiRT & Digital India Foundation and Dr Le Thi Hang Nga, Deputy Editor-in-Chief, Journal for Indian & Asian Studies, Institute for Indian and Southwest Asian studies.

The webinar highlighted S&T cooperation as one of the important pillars of India-Vietnam relations, and the significance of boosting bilateral STI cooperation as an important area of Science Diplomacy. The speakers underlined dynamic nature of existing S&T cooperation between the two countries and stressed at its diversification in future. The key sectors identified include renewable energy, digital economy, new technology start-ups, ICTs, healthcare, ocean mapping, costal management, environment protection and blue-economy cooperation. Building cooperation to foster technological capabilities and promoting respective firms in Global Value Chains is important. India can learn from Vietnam's successful management of COVID-19, its experience in successfully linking agriculture research with agricultural production, industry and marketing. Biotechnology, material sciences, oceanography, ICT, pharmaceuticals and healthcare were identified as areas for greater mutual attention. The existing challenges in S&T cooperation could be mitigated through effective coordination between governmental and non-governmental agencies including, universities and S&T institutions. Strengthening cooperation in social sciences and humanities also constitutes an important aspect of building collaborations in STI and overall cooperation between the two countries. India and Vietnam could also jointly develop a roadmap for achieving SDGs through STI.

Warsaw Science Diplomacy School 2020[1]

Science Diplomacy plays a crucial role in tackling global challenges like, climate change, disease outbreaks, etc. Recognising this, European Union's Horizon 2020 funded project, Inventing a shared Science Diplomacy for Europe (InsSciDE) with its partner institution, European Academy of Diplomacy co-organised a week-long intensive training programme for professionals and students from varied fields and age groups, during 22 June-26 June, 2020. Given the COVID-19 pandemic, the first edition of InsSciDE's Warsaw Science Diplomacy School (WSDS) was held virtually through zoom. The School brought together 28 participants from 6 continents and 27 countries, including 10 EU member states. The mentors and instructors also added to its diversity.

The progamme was unique as it sought to develop policy and strategic outcomes through historical case studies of scientist's role during scramble for Africa, biodiversity negotiations, health, epidemic and ocean diplomacy. There were four case study teams with their respective mentors. WSDS entailed lectures, group discussions and team assignments. The lectures focused on various aspects of linking history to science diplomacy in addition to assessing risk, safety and security (RSS) concerns in science diplomacy. As team assignments, students developed a policy advice for strengthening science diplomacy in specific case study areas for the EU's external coordination group (EXCO) and a short presentation reflecting RSS dimensions for proposed strategies at individual, organisational and state level. The organisers made efforts to outdo the challenges of the virtual experience through group interactions and pre-teaching sessions before the school, and various ice-breaker activities, breakout sessions and engaging evaluation sessions during the school. On the last day, a grand graduation ceremony was held and WSDS Expert Guidance bonus for each participant was announced.

[1] Perspective 'Warsaw Science Diplomacy School 2020 – A Flashback' is available at http://thesciencepolicyforum.org/articles/perspectives/warsaw-science-diplomacy-school-2020-a-flashback/

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CALL FOR PAPERS

SCIENCE DIPLOMACY REVIEW (SDR)
NOVEMBER 2020 ISSUE
(Volume 2, No. 3)

Editors: Prof. Sachin Chaturvedi, Amb. Dr. Bhaskar Balakrishnan and Dr. Krishna Ravi Srinivas

Science Diplomacy Review (SDR) a multidisciplinary, peer-reviewed international journal, is a forum for scholarship on theoretical and practical dimensions in science diplomacy. It seeks to discuss and engage with the developments, issues, perspectives and institutions in science diplomacy. We invite contributions on issues related to science diplomacy in the form of research articles, perspectives, essays, book reviews and review articles. Manuscripts on the role and relevance of science diplomacy in understanding and mitigating the present COVID-19 outbreak as well as epidemics in future, SDGs, and other global challenges in the post-COVID world are also welcome. We welcome contributions from scientists, diplomats, policymakers, researchers, research scholars and representatives of civil society for the forthcoming November 2020 SDR issue.

SDR is an open access journal published by Forum for Indian Science Diplomacy (FISD) based at Research and Information System for Developing Countries (RIS), New Delhi, India. RIS is an autonomous independent policy research think tank with the Ministry of External Affairs. The Science Diplomacy Programme funded by the Department of Science & Technology is being implemented by RIS.

Most challenges facing the world today including the present COVID-19 outbreak, climate change, environmental degradation are complex, interdependent and transnational. The Sustainable Development Goals (SDGs) which seek to address numerous global challenges also require a multilateral and internationally coordinated response. Science, Technology and Innovation (STI) lies at the core of these efforts. Finding relevant solutions to these challenges require leveraging STI through effective multilateral and global partnerships between scientists, policymakers and diplomats. Science diplomacy assumes a crucial role in achieving SDGs, and for development cooperation to address global concerns. It calls for international science cooperation, dialogues and engagements between various stakeholders and countries. Science diplomacy is increasingly adopted as a useful tool by many governmental and non-governmental organisations in both developed and developing countries.

SDR has been launched as a journal, inter alia, to reflect upon and debate on the above mentioned themes.

Categories: Submit manuscripts including, full length articles and essays (4,000 – 6000 words), perspective (2,500 - 4,000 words) or book reviews/report reviews/event reviews (1,000 - 1,500 words) by October 5, 2020 to **science.diplomacy@ris.org**.in with "SDR – November Issue" in the subject. We are open to considering longer articles as long as they are relevant to the overall objectives of SDR. Previous SDR Issues can be accessed on **http://www.fisd.in/science- diplomacy-review**

G20: Call for Papers

G20 is gaining importance as a global platform for articulation of economic, social and development issues, opportunities, concerns and challenges that the world is confronting now. Over the years, G20 has witnessed a significant broadening of its agenda into several facets of development. India is going to assume G20 presidency in 2022 which would be important not only for the country but also for other developing countries for meeting the Sustainable Development Goals and achieving an inclusive society. India can leverage this opportunity to help identify G20 the suitable priority areas of development and contribute to its rise as an effective global platform.

In that spirit, Research and Information System for Developing Countries (RIS), a leading policy research institution based in New Delhi, has launched a publication called G20 Digest to generate informed debate and promote research and dissemination on G20 and related issues. This bi-monthly publication covers short articles of 3000 to 4000 words covering policy perspectives, reflections on past and current commitments and proposals on various topics and sectors of interest to G20 countries and its possible ramifications on world economy along with interviews of important personalities and news commentaries.

The Digest offers promising opportunities for academics, policy makers, diplomats and young scholars for greater outreach to the readers through different international networks that RIS and peer institutions in other G20 countries have developed over the years. The interested authors may find more information about the Digest and submission guidelines on the web link: **http://www.ris.org.in/journals-n-newsletters/G20-Digest.**

Guidelines for Authors

1. Submissions should contain institutional affiliation and contact details of author(s), including email address, contact number, etc. Manuscripts should be prepared in MS-Word version, using double spacing. The text of manuscripts, particularly full length articles and essays may range between 4,000- 4,500 words. Whereas, book reviews/event report shall range between 1,000-15,00 words.

2. In-text referencing should be embedded in the anthropological style, for example '(Hirschman 1961)' or '(Lakshman 1989:125)' (Note: Page numbers in the text are necessary only if the cited portion is a direct quote). Footnotes are required, as per the discussions in the paper/article.

3. Use's' in '-ise' '-isation' words; e.g., 'civilise', 'organisation'. Use British spellings rather than American spellings. Thus, 'labour' not 'labor'. Use figures (rather than word) for quantities and exact measurements including percentages (2 per cent, 3 km, 36 years old, etc.). In general descriptions, numbers below 10 should be spelt out in words. Use fuller forms for numbers and dates— for example 1980-88, pp. 200-202 and pp. 178-84. Specific dates should be cited in the form June 2, 2004. Decades and centuries may be spelt out, for example 'the eighties', 'the twentieth century', etc.

Referencing Style: References cited in the manuscript and prepared as per the ***Harvard style*** of referencing and to be appended at the end of the manuscript. They must be typed in double space, and should be arranged in alphabetical order by the surname of the first author. In case more than one work by the same author(s) is cited, then arrange them chronologically by year of publication.

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About FISD

As part of its ongoing research studies on Science &Technology and Innovation (STI), RIS together with the National Institute of Advanced Studies (NIAS), Bengaluru has endeavoured a major project for Science Diplomacy this year, supported by the Department of Science and Technology. The programme was launched on 7 May 2018 at New Delhi. The Forum for Indian Science Diplomacy (FISD), under the RIS–NIAS Science Diplomacy Programme, envisages harnessing science diplomacy in areas of critical importance for national development and S&T cooperation.

The key objective of the FISD is to realise the potential of Science Diplomacy by various means, including Capacity building in science diplomacy, developing networks and Science diplomacy for strategic thinking. It aims for leveraging the strengths and expertise of Indian Diaspora working in the field of S&T to help the nation meet its agenda in some select S&T sectors.

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CONTENTS *(continued from outside front cover)*

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