



Task Force 3:
LiFE, Resilience, and Values for
Wellbeing



RESILIENT HEALTH INFRASTRUCTURE AND DISASTER RISK REDUCTION: EXPERIENCES FROM THE GLOBAL SOUTH

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Abstract






There are coordinated attempts to use data science for disaster risk reduction (DRR) as well as for planning resilient health infrastructure. Various special interest groups have been formed within the data science community for formulating suitable action plans and strategies to use data science for DRR and planning resilient health infrastructure. This Policy Brief highlights the nature and composition of global scientific programmes engaged in promoting data-driven policymaking for DRR. It


further explores the FAIR data principles that refer to achieving findable, accessible, interoperable, and reusable data resources at various levels. Even as India's presidency encourages collective work by the G20, this Policy Brief discusses different initiatives of the Global South that may inspire others to promote data-driven decision-making while dealing with natural disasters. The 'Data, Information, Knowledge, and Action' model is also highlighted and Project SAHAYTA proposed for the G20 nations to build resilient health infrastructure.



The Challenge

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Information and Communication Technologies (ICTs) have been used in different spheres of life across the world over the past few decades. Developing nations have also improved their ICT infrastructure. Since the inception of the G20, member countries have been cooperating for building ICT-enabled public infrastructure, such as healthcare ecosystems and disaster risk reduction (DRR) mechanisms. The G20 nations also cooperate to set up consensus-based standardisations and encourage best practices and knowledge-sharing for the betterment of society. There are many instances of South-South and North-South cooperation for achieving the global goals, such as the Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs), and the targets of the Sendai Framework for Disaster Risk Reduction (SFDRR). The UNESCO Recommendation on Open Science, which was adopted by the member countries at the 41st session of the General Conference in November 2021, will play a significant role in making public data available and accessible to DRR researchers and decision-makers (Das and Dutta 2021, Das and Dutta 2020; Das 2021). This Policy Brief draws insights from a case study of

building resilient health infrastructure and the Global South-based initiatives of disaster risk reduction, utilising data science approaches.

Under India's presidency, the first G20 Health Working Group (HWG) meeting was held in Thiruvananthapuram January 2023. It identified three priorities for the member countries: (i) health emergencies prevention, preparedness and response (focusing on One Health and antimicrobial resistance); (ii) strengthening cooperation in the pharmaceutical sector while focusing on access to and availability of safe, effective, quality and affordable medical countermeasures (vaccines, therapeutics, and diagnostics); and (iii) digital health innovations and solutions to aid universal health coverage and improve healthcare service delivery. Section 3.1 of this Policy Brief presents a case study of resilient health infrastructure that can help in strengthening some of the HWG priorities.

Under India's presidency, the first G20 Disaster Risk Reduction Working Group (DRR-WG) meeting was organised in Gandhinagar in March 2023. It identified five priorities for the member countries: (i) global coverage of early warning




systems; (ii) increased commitment to making infrastructure systems disaster-resilient; (iii) stronger national financial frameworks for DRR; (iv) strengthened national and global disaster response systems; and (v) increased application of ecosystem-based approaches to DRR. Delegates from the G20, who took part in the DRR-WG meeting, shared their experiences in dealing with geophysical disasters and how they used the learnings from these to design a green, inclusive and resilient future. The experiences from the recent Turkey–Syria earthquake, particularly the humanitarian as well as the data-driven approaches, were appraised during the meeting. Section 3.2 of this Policy Brief presents a set of recommendations, related to data-driven DRR, which can help in strengthening some of the DRR-WG priorities.

1.1 Global Scientific Programmes for Promoting Data-Driven Policymaking in Disaster Risk Reduction

The International Science Council (ISC), earlier known as the International Council of Scientific Unions (ICSU), has been actively engaged in promoting DRR through its Programme on Integrated Research on Disaster Risk

(IRDR). The IRDR is a decade-long research programme, co-sponsored by the ISC and the United Nations Office for Disaster Risk Reduction (UNDRR). The mission of the IRDR is to develop transdisciplinary, multisectoral alliances for in-depth, practical DRR research or studies and implementation of effective, evidence-based disaster risk policies and practices.

In 2021, the ISC and the UNDRR jointly released the Hazard Information Profiles (HIPs) to help policymakers improve DRR policies (Das and Dutta 2023). The ISC Policy Brief 1 analyses the science and technology gap and its incorporation into DRR management at local levels.¹ The ISC Policy Brief 2 showcases how the hazard definitions, published in the UNDRR/ISC HIPs, are being used to support DRR at global and national levels.² This Policy Brief is based on previous ISC documents on hazard definitions and classification review and HIPs. The ISC Policy Brief 3 makes seven key policy recommendations, including improving partnerships among intragovernmental agencies, academia, the private sector, NGOs and insurance authorities, ensuring standardised quantification of disaster loss data and identifying the gaps in risk assessment.³




The ISC's Global Risks Perceptions Report 2021 highlights scientists' perception of the top 35 global risks and the other ones identified by them. The Committee on Data of the International Science Council (CODATA) also released two policy briefs and three white papers to help public policymakers with data governance at regional, national, and local levels for effective DRR management. Many research councils and funding agencies from the G20 nations are the institutional members of the ISC and its subordinate unit, CODATA.

1.1.1 CODATA for Promoting Data-Driven Disaster Risk Reduction

CODATA and several other organisations have been promoting FAIR data principles for scientific data, research data, and DRR data while the data-driven ecosystem of resources ensures that data is FAIR (findable, accessible, interoperable, and reusable) for humans and machines. The CODATA Task Group on FAIR Data for Disaster Risk Research, in addition to other task groups and working groups of the organisation, ensures effective, maximally automated data stewardship, useful terminologies, metadata specifications, and global partnerships through the CODATA Decadal Programme, Data for the

Planet: Making Data Work across Domain Boundaries. CODATA has been publishing a monthly newsletter since October 2018, focusing on the latest data-driven DRR news, publications, and forthcoming events, collected from all DRR and disaster data networks.

In 2020–2022, CODATA, in association with the CEPT Research and Development Foundation (CRDF), India, and other organisations, launched three podcasting series, titled Data for Resilient Cities, Data-Knowledge-Action for Urban Systems, and Data for Disaster Risk Reduction (Das and Dutta 2023). These series collectively broadcast 39 episodes, invited experts from both G20 and non-G20 nations to discuss critical issues, pointed out the way forward and elaborated on good practices, lessons learnt and communities of practice from both the Global South and Global North. These podcasts offered a rich collection of conversations, case studies, and audio essays, and focused on the systematic changes, required for making cities adaptive to and intelligent for handling urban well-being, and the systematic use of data for tackling disasters and making effective decisions for post-disaster recovery.



The Data, Information, Knowledge, and Action (DIKA) model for urban systems, as showcased by CODATA Task Group, helps create intelligent systems for DRR using scientific and quantitative data (Das and Dutta 2023). The podcasts further reflected on the role of data at each stage of the disaster management cycle – mitigation, preparedness, response, and recovery. In the podcasts, the DRR practitioners and the data science researchers also talked about the use of big data to predict natural disasters. These also reflected the interdisciplinary approaches adopted and/or to be adopted by various smart, resilient or sustainable cities worldwide to achieve the Sustainable Development Goals and other objectives, as outlined in the Sendai Framework for Disaster Risk Reduction 2015–2030.

1.1.2 Research Data Alliance for Promoting Data-Driven Disaster Risk Reduction

The Research Data Alliance (RDA) is a community-driven global organisation, comprising data scientists, research data managers, and professionals


and institutions working on scientific and research data. The RDA is built on principles that include openness, inclusivity, and transparency. This international network represents over 12,400 members from 145 countries, including the G20 nations. It consists of several working groups (WGs) and interest groups (IGs) for promoting data-driven DRR globally. For example, the RDA COVID-19 Epidemiology Sub-Working Group released a comprehensive report, titled COVID-19 Data Sharing in Epidemiology, in November 2020. The RDA Working Group on Epidemiology Common Standard for Surveillance Data Reporting held a session in the RDA Plenary 16 in 2020. The RDA WGs and IGs have been working closely with CODATA, the World Data System (WDS), and the Integrated Research on Disaster Risk (IRDR) to promote data-driven disaster risk reduction and set up standards and best practices for sharing and governance of DRR data.



The G20's Role

2






The G20 nations orchestrated the paradigm shifts in many areas of the SDGs, including those pertaining to good health and well-being (SDG3) and climate action (SDG13), and the SFDRR through collaborations and co-developments. Many of the global goals have active collaborative participation from the G20 nations while they hand-hold development practitioners and action researchers, utilising the bilateral and multilateral cooperation treaties. The trade and development strategies seem to have been streamlined among the G20 nations during the COVID-19 pandemic, confronting the challenges faced by the participating countries to mitigating risks associated with lives and livelihoods.

The post-COVID-19 world has more challenging tasks of uplifting economic prudence while underlining the global goals. These goals have been shifted or postponed in several G20 countries, particularly in the developing countries, due to the overwhelming challenges of the pandemic.

With active leadership and domain expertise, equipped with an entrepreneurial spirit, G20 nations can

join hands within the group to create an enabling environment for mutual knowledge exchange, collaborative development of data-driven DRR mechanisms and technologies for mitigating disaster risks, open innovation, and technology transfer among themselves. They can also create institutional mechanisms for imparting key technical skills to young DRR practitioners and aspiring DRR professionals. For example, the G20 Secretariat can strengthen capacity-building programmes, such as the Indian Technical and Economic Cooperation Programme (ITEC), in member nations for imparting key technical and green skills to youths.

Most of the G20 nations have state-of-the-art research and innovation infrastructure, digital public infrastructure, and information-sharing mechanisms, as has been reflected in the Global Innovation Index 2022 and its earlier editions, published by the World Intellectual Property Organization (WIPO) since 2007. Similarly, the ICT Development Index 2017 and its earlier editions, published by the International Telecommunication Union (ITU), have indicated that the G20 nations have qualitative digital public infrastructure,



compared with most of the non-G20 nations. Thus, the G20 nations will have more inclusive data-driven disaster risk reduction mechanisms and resilient

health infrastructure while collaboration and cooperation within the group through bilateral and multilateral routes are ensured.



Recommendations to the G20

3



3.1 Project SAHAYTA: A Case Study from India

3.1.1 Need for Resilient Health Infrastructure

Climate change, climate financing and accelerating the move towards net-zero economies have all taken centre stage on global multilateral forums. Along with this, the need to strengthen economies following the pandemic, especially when the geopolitical and inflationary shocks are taken into consideration, is equally important to prevent countries from slipping into recessions, thereby further widening the gap in attaining the SDGs by 2030. Central to these challenges is the role of equitable health services in countries of the Global South, which are struggling with the worst impacts of climate change and under-investment in health services, and lagging in the progress towards SDGs.

Under the proposed Project SAHAYTA (Sustained Assistance on Healthcare Access, Technology, and Aid), the G20 must explore mechanisms to finance and support critical and vulnerable health infrastructure in developing countries bearing the brunt of climate change. Providing specific and targeted support for healthcare infrastructure

and technologies within the paradigm of climate impact assumes strategic and humanitarian importance. Support for health services in the developing world and capacity-building for disaster management have hitherto been operating in distinct silos. The devastating impact of climate change-induced disasters on the continuity of health services has adequately underlined the need for making these parallel tracks meet.

Public policy on health services has traditionally approached the subject through the lens of access, equity, affordability, and quality. In line with the conventional policy frameworks, financing of health services has also followed the more traditional felt needs within healthcare. India is presented with a unique opportunity to create this paradigm shift in the approach to health policy, especially for the Global South.

3.1.2 Project Mechanism

Under Project SAHAYTA, vulnerable countries can identify centres of excellence (CoEs) and critical health infrastructure projects (CHIP) that can access funds to strengthen climate and disaster adaptation (Thakur 2023). This should include building islanding and

passive resilience in the case of extreme climate events; installation of capacities for utility generation and storage; ability to harness renewable energy through newly installed technologies; critical inventory maintenance for life-saving medications, medical gases and other supplies; and development of health information technology systems that can, say, enable telemedicine facilities in the case of an identified health centre going off-grid during a climate emergency.

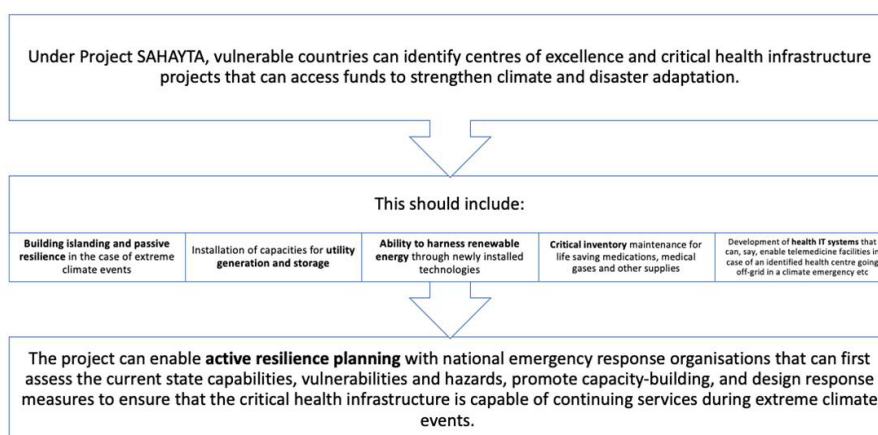
Through the project, health centres will be able to build resilience that can withstand extreme events that are localised to their areas of operation. Additionally, the project can enable active resilience planning with national

emergency response organisations that can first assess the current state capabilities, vulnerabilities and hazards, promote capacity-building, and design response measures to ensure that the critical health infrastructure is capable of continuing services during extreme climate events.

3.1.3 Identification of Countries, CHIP and Funding

- Identify CoEs and CHIP by countries. Project SAHAYTA can explore the introduction of new health and medical technologies, developing a telemedicine framework and other capacity- and knowledge-building initiatives with Mauritius. The Project SAHAYTA can collaborate with the Jawaharlal

Figure 1: The Mechanism of the Project



Nehru Hospital, one of the premier healthcare institutions in Mauritius providing quality healthcare and medical facilities to the public. The hospital, inaugurated in 1990, is supported and funded by the Ministry of External Affairs (MEA), Government of India. Further, the Project can initiate a technical collaboration with the World Health Organization's Climate Resilient Health Systems Initiative.


- Global funding agencies, such as the World Bank, can be engaged. For example, in 2021, the World Bank provided funding worth US\$33 billion for climate change mitigation and US\$17 billion for climate change adaptation.

Funding for vulnerable countries, especially with regard to climate risks, mitigation and adaptation, has been regrettably contentious. The G20 should look at various multilateral sources of funding and look for specific assignments regarding financial support for health infrastructure. An agreement on such a mechanism will help formalise and codify support for vulnerable health systems that invariably struggle to provide health services and face

climate-induced health infrastructure challenges.

3.1.4 Impact and Monitoring


- Identify 100 CoEs /CHIP in the G20 nations, applying filters of country assessment with regard to climate change, health profile, infrastructure preparedness, gap analysis, funding requirement, etc.
- Ensure budgetary allocation with time-bound milestones.
- Ensure capacity-building through G20 country agencies [e.g., the National Disaster Management Authority (NDMA) and the Centers for Disease Control and Prevention (CDC)], interlocking with relevant multilateral agencies and developmental agencies.
- Create a Project SAHAYTA monitoring cell within the G20 Secretariat, which will provide updates on progress and attainment of milestones, and manage/select new CHIP.
- Create an impact inventory for use by other countries.



3.2 Recommendations Related to Data-driven Approaches to Disaster Risk Reduction

This Policy Brief recommends the following points to achieve the data-driven approaches to disaster risk reduction in the G20 nations:

- The G20 nations should introduce a global collaborative programme to promote data-driven disaster risk reduction and set up standards and best practices for sharing and governance of DRR data.
- The DIKA model may be explored and expanded in the G20 nations to create intelligent systems for disaster risk reduction, using scientific and quantitative data.
- The G20 nations should build a knowledge exchange platform and an open access knowledge repository, wherein sectoral experts and grassroots practitioners can collaborate to discuss critical issues and data-driven approaches, and offer good practices, lessons learnt, and communities of practice from the Global South as well as the Global North for the disaster risk reduction framework.
- The G20 nations should expand their data-driven disaster risk reduction strategies, involving their public policymakers, legislators, thinkers, data scientists, action researchers, disaster management professionals, innovators, and social scientists.
- The G20 nations should promote advocacy and awareness programmes, involving key stakeholders.
- The G20 nations should promote research and innovation (RI) in the domain of disaster risk reduction, involving public research funding agencies, corporate social responsibility funding, innovators, entrepreneurs, and philanthropists.
- The G20 nations should ensure the adoption of an environmental, social, and governance (ESG) framework in the transformative RI initiatives, related to disaster risk reduction, involving major stakeholders.


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- The G20 nations should have a monitoring and evaluation mechanism in place on a periodic basis in the initiatives related to disaster risk reduction and resilient healthcare.
 - The G20 nations should ensure imparting green skills to local youths and expanding the skill development, assessment, and certification framework in the domain of disaster risk reduction.



Conclusion

4





Ever since the SFDRR came into existence, international collaborations on data-driven DRR have been on the rise, involving globally reputable organisations, institutions, and networks. DRR professionals are effectively engaged with data science professionals in each stage of the disaster management cycle – mitigation, preparedness, response, and recovery. On the other hand, data science embraces emerging technologies, such as artificial intelligence, machine learning, deep learning, internet of things (IoT), and connected networks, to mitigate the risks associated with natural and other kinds of disasters. Big Data analytics appear to be highly effective for analysing and visualising large-scale datasets, related to all types of disasters, and helping public policymakers interpret disaster events and predict future events.

A number of T20 Policy Briefs highlight building digital public infrastructure, climate data ecosystem, and information-sharing mechanisms for key societal interventions in the G20 nations. Building digital public infrastructure and information-sharing mechanisms for monitoring zoonotic diseases is required for minimising societal risks

and for prevention of loss of lives and livelihoods in the G20 nations.⁴ The digital data-sharing infrastructure on zoonotic diseases can be expanded since the COVID-19 pandemic has helped in building many such initiatives in the G20 nations and beyond. Data-driven monitoring of zoonotic diseases will help prevent any large-scale spread of the diseases and properly channel public resources.

Many prototypes have been developed to aid data-driven DRR, including those created by stakeholders from the G20 nations. Mobile apps are also being developed by start-ups, professional developers, and researchers from the G20 nations to assist risks and disaster response communities locally and nationally. Their success stories and best practices will inspire other start-ups and entrepreneurs to use notable Big Data analytics for predicting natural disasters, enhancing the agility of the disaster response communities across the world, more particularly in the Global South. The international networks and data-driven DRR communities are here to serve and collaborate with national and provincial governments, hand-holding them to survive the toughest disaster events.

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