

1. Asian Disaster Reduction Center

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The Asian Disaster Reduction Center (ADRC) was established in 1998 as a regional initiative aimed at enhancing disaster resilience, building safer communities, and creating a society where sustainable development is attainable among its 31-member countries (Annex 1: History of Establishment of ADRC).

1.1 Key Activities

At the end of every fiscal year, ADRC develops an Annual Report highlighting its achievements and milestones along these three pillars of activities:

- **Information sharing.** This pillar includes the ADRC website, Global unique disaster IDentifier (GLIDE) number system, Sentinel Asia, and Asian Conference on Disaster Reduction (ACDR).
- **Human resource development.** This pillar includes the Visiting Researchers (VR) program, seminars, workshops, and training activities on disaster risk reduction (DRR).
- **Cooperation among member countries and partner organizations.** This pillar includes development and promotion of innovative tools as well as forging partnerships and networks to advance resilience to disasters (e.g., research and international engagements).

After 21 years functioning as part of the Urban Disaster Research Institute (URDI), ADRC became independent and obtained a corporate status in April 2020 following the launch of the ADRC Foundation. Under this newly reconfigured status, ADRC gained greater flexibility in performing its international operations as well as bolstering its domestic activities.

1.2 Composition

ADRC is composed of member and advisor countries (Figure 1.1. Map of member and advisor countries) as well as partner organizations. Member countries share information, experiences, and expertise on DRR and ADRC disseminates them regionally by means of dispatching of experts and other methods. Advisor countries support the activities of ADRC by sharing their experiences and experiences through dispatch of experts to member countries and ADRC and offer of financial contributions.



Figure 1.1 Map of member and advisor countries

1.2.1 Member and Advisor Countries

During its establishment in 1998, ADRC was comprised of 22-member countries, 4-advisor countries, and 1-observer organization. As time goes by, the membership has been expanding, with Armenia joining in August 2000, the Kyrgyz Republic in July 2002, Pakistan in July 2005, Yemen and Bhutan in December 2007, Azerbaijan in 2009, the Maldives in 2010, the Republic of Iran in 2012, and Türkiye in 2018, bringing the number of member countries to 31 (as of 31 March 2023). In March 2004, the US joined as the fifth advisor country to ADRC (Table 1.1. Member and Advisor Countries).

Table 1.1 Timeline of the Expansion of Member and Advisor Countries

1998 (At the time of foundation)	India, Indonesia, Uzbekistan, Kazakhstan, Cambodia, Singapore, Sri Lanka, Thailand, Republic of Korea, Tajikistan, China, Japan, Nepal, Papua New Guinea, Bangladesh, Philippines, Vietnam, Malaysia, Myanmar, Mongolia, Lao PDR and Russia (Member countries: 22) Australia, Switzerland, New Zealand and France (Advisor countries: 4) Asian Disaster Preparedness Center (Observer)
2000	Armenia
2002	Kyrgyz Republic
2004	USA (Advisor country)
2005	Pakistan
2007	Bhutan, Yemen
2009	Azerbaijan
2010	Maldives
2012	Islamic Republic of Iran
2018	Türkiye

ADRC’s counterparts are the disaster risk management (DRM) agencies (Table 1.2).

Table 1.2 Counterpart Agencies

Country	Counterpart
Armenia	Regional Survey for Seismic Protection (RSSP), Ministry of Internal Affairs
Azerbaijan	Ministry of Emergency Situations
Bangladesh	Ministry of Disaster Management & Relief
Bhutan	Ministry of Home Affairs
Cambodia	The National Committee for Disaster Management (NCDM)
China	National Disaster Reduction Center of China
India	Ministry of Home Affairs
Indonesia	The National Agency for Disaster Countermeasure (BNPB)

Country	Counterpart
Iran	National Disaster Management Organization (NDMO)
Japan	Cabinet Office
Kazakhstan	Ministry of Emergency Situations
Republic of Korea	Ministry of the Interior and Safety (MOIS)
Kyrgyz Republic	Ministry of Emergency Situations
Lao PDR	Disaster Prevention and Risk Reduction Division, Social Welfare Department, Ministry of Labour and Social Welfare
Malaysia	National Disaster Management Agency (NADMA)
Maldives	National Disaster Management Authority (NDMA)
Mongolia	National Emergency Management Agency (NEMA)
Myanmar	Department of Disaster Management, Ministry of Social Welfare, Relief and Resettlement
Nepal	Ministry of Home Affairs
Pakistan	National Disaster Management Authority (NDMA)
Papua New Guinea	National Disaster Centre (NDC), Ministry of Defence
Philippines	Office of Civil Defense (OCD), Department of National Defense (DND)
Russia	Ministry of the Russian Federation for Affairs Civil Defense, Emergencies and Elimination of Consequences of Natural (EMERCOM)
Singapore	Singapore Civil Defence Force (SCDF)
Sri Lanka	Disaster Management Centre, Ministry of Defence
Tajikistan	Committee of Emergency Situations and Civil Defense
Thailand	Department of Disaster Prevention and Mitigation (DDPM), Ministry of Interior
Türkiye	Disaster and Emergency Management Presidency (AFAD), Ministry of Interior
Uzbekistan	Ministry of Emergency Situations
Viet Nam	Vietnam Disaster and Dyke Management Authority (VDDMA), Ministry of Agriculture and Rural Development (MARD)
Yemen	Ministry of Water and Environment

1.2.2 Partner Organizations

To contribute to the efforts of disaster risk reduction in Asia, ADRC considers a global perspective in cooperation with a variety of UN agencies and international organizations or initiatives, such as the United Nations Office for Disaster Risk Reduction (UNDRR), the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), the United Nations Development Programme (UNDP), and the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP).

2. Highlights of FY2022.

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Towards the end of Fiscal Year 2022, ADRC activities were gradually implemented in-person, including the Asian Conference on Disaster Reduction (ACDR2022) which was held in March 2023 in Sendai, Japan. It signaled the lifting of restrictions brought about by the COVID-19 pandemic.

2.1 Activities in Figures

At a glance, Figure 2.1 shows the ADRC milestones of FY2022 in three activities areas: 1) information sharing; 2) human resource development; and 3) international cooperation.

ADRC MILESTONES OF FISCAL YEAR 2022

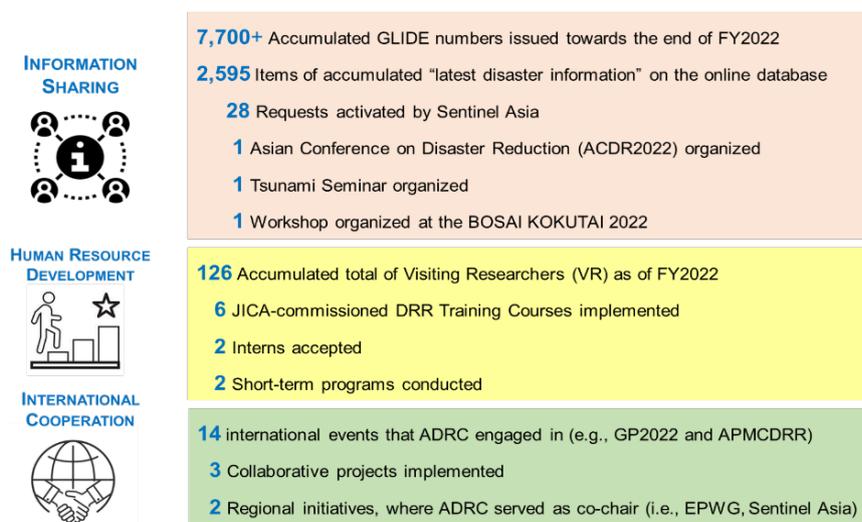


Figure 2.1 Highlights of ADRC Activities in FY2022

2.2 Asian Conference on Disaster Reduction 2022

Organized in a hybrid format to reach a broader participation of member countries, the ACDR2022, held on 10–12 March 2023, gathered 84 in-person participants from 17 countries in Sendai International Center, Miyagi Prefecture and attracted 121 online participants from 22 countries. ACDR2022 adopted the theme, "WHAT IS NEXT? Learning from the Past, Preparing for the Future". Since 2023 marks the 100th year of the Great Kanto Earthquake that struck Tokyo in 1923, ACDR2022 organized a special session to commemorate and discuss the lessons from the disaster. ACDR2022 had three key thematic sessions:

1) Large-Scale Disasters and Countermeasures; 2) Broaden Our Horizons for Disaster Data Linkage in SFDRR Implementation: Application of GLIDE (Global Identifier Number); and 3) The Provision of Information via Satellite for Disaster and Crisis Management.



Figure 2.2 Group Photo at the Asian Conference on Disaster Reduction 2022

2.2.1 Opening and Keynote Speeches

Mr TANI Koichi (Minister of State for Disaster Management and Ocean Policy and a member of the House of Representatives of the Government of Japan), when referring to the Türkiye-Syria earthquakes of 6 February 2023, said that he was saddened by the situation knowing that over 40,000 people died or missing while thousands of houses collapsed. He stressed that the Japanese government is committed to providing the utmost support to the people in the disaster-affected areas based on their needs. He also stated that lessons from recent disaster experiences need to be widely shared in the conference to help strengthen disaster prevention measures and accelerate the implementation of reconstruction projects. He hoped that the conference will serve as a starting point to further enhance disaster risk reduction measures and subsequently strengthen solidarity among countries.

Mr Yunus SEZER (Head, Disaster and Emergency Management Presidency, Türkiye), in his message which was read by Mr SASAHARA Akio of ADRC, expressed gratitude for the solidarity and generosity of the people around the world whom he believed as “a beacon of hope” for the people of Türkiye during the difficult time. The earthquakes, with more than 15,000 aftershocks in four weeks, affected 11 provinces, directly impacting approximately 110,000 km². Turkish government, through the Disaster and Emergency Management Presidency (AFAD) received an overwhelming support from 86 countries that sent search and rescue teams. After the message, a minute of silence was observed for the people affected by the earthquakes.

Dr HAMADA Masanori (Chairman of ADRC and Professor Emeritus at the Faculty of Science and Engineering of Waseda University), in his remarks, said that the Türkiye-Syria earthquakes revealed that there remains a huge number of vulnerable houses and buildings all over the world without reinforcement. Since Türkiye is member of ADRC, and in his capacity as chairman, he encouraged all member countries to further strengthen their partnerships to assist and support the people in affected areas and to provide guidance for a resilient recovery.



Figure 2.3 Keynote Speakers at the Opening Session of ACDR2022

Ms KORI Kazuko (Mayor of Sendai City) said that March 11 marks the 12th year of the Great East Japan Earthquake, and once again DRR practitioners, experts, and officials from different countries gathered in Sendai to learn and discuss preparedness measures against earthquakes, tsunamis, and the intensifying storms and floods. Corollary to this, and in accordance with the midterm review of the Sendai Framework for DRR 2015–2030 (SFDRR), she noted that Sendai City drafted an interim report on the progress of implementing the SFDRR from the perspective of the local government. She ended her remarks with a

commitment that Sendai City will pass on the lessons from the Great East Japan Earthquake to Asian countries and the world.

2.2.2 Special Session on the Centenary of the Great Kanto Earthquake

This special session comprised three discussion topics: 1) Lessons learned from the 1923 Kanto earthquake and subsequent countermeasures; 2) New findings and remaining challenges from the 1995 Great Hanshin-Awaji Earthquake and the 2011 Great East Japan Earthquake; and 3) What needs to be done to mitigate damage in disaster-prone Asia. Panel members comprised four renowned experts: 1) Dr HAMADA Masanori, Chairman of ADRC and Professor Emeritus at the Faculty of Science and Engineering of Waseda University; 2) Dr ITO Shigeru, President of ADRC and Professor Emeritus at the University of Tokyo; 3) Dr HASEMI Yuji, Professor Emeritus at the Faculty of Science and Engineering of Waseda University; and 4) Prof SHIGEKAWA Kishie, Professor at the Faculty of Social and Environmental Studies of Tokoha University. Mr YOSHIMURA Hidemi, former Chief Commentator at NHK Japan Broadcasting Corporation moderated this special session. Outcomes of the special session highlighted the following observations and lessons.



Special Session on the Centenary of the Great Kanto Earthquake: What can we learn from past disasters and how can we apply the lessons learned?
10:30 - 12:00 (UTC+9)

Moderator

Speakers

YOSHIMURA Hidemi
Former Chief Commentator
NHK (Japan Broadcasting Corporation)

ITOH Shigeru
President
Asian Disaster Reduction Center (ADRC), Professor Emeritus of the University of Tokyo

HAMADA Masanori
Chairman
Asian Disaster Reduction Center (ADRC), Professor Emeritus, Faculty of Science and Engineering, Waseda University

HASEMI Yuji
Professor Emeritus
Faculty of Science and Engineering Waseda University

SHIGEKAWA Kishie
Professor
Faculty of Social and Environmental Studies, Tokoha University

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Figure 2.4 Speakers of the Special Session on the Centenary of the Great Kanto Earthquake

Observations

- The Great Kanto Earthquake was seen as the catalyst for a major step-up in architecture and urbanism in Japan
- It inspired efforts for safe town planning, embracing modern urban design for reconstruction
- It inspired seismic design, leading to the enforcement of Urban Building Act in 1920
- It inspired the introduction of fire control measures in metropolitan areas
- It inspired improvement in legal systems for assisting victims and maintaining records

Lessons

- Large-scale disasters could inform disaster preparedness efforts, particularly in the areas of town planning, building safety, and development of parks and disaster prevention centers
- Recovery from large-scale disasters could trigger societal and technological changes (e.g., providing tax exemption incentives/preferential loan interest rates for earthquake-resistant buildings or promote the construction of tsunami evacuation towers/breakwaters)
- Large-scale disasters could also inform the mitigation measures against major earthquakes that are predicted to occur in the future (e.g., Nankai Trough)

Mr YOSHIMURA concluded the special session by proposing the concept of “Ethical DRR”. This concept means that all DRR efforts should not be confined within the scope of legal regulations but they should also promote ethical perspectives such as saving lives, leaving no one behind, and ensuring that people are safe from disasters through investments prevention and mitigation efforts.

2.2.3 Session 1: Large Scale Disasters and Countermeasures

This session shared information on the current situation and responses to large-scale disasters, which are intensifying around the world due to the climate crisis and increasing economic damage due to the progress of urbanization, and the cascading and compounding of disasters. Furthermore, it provided an opportunity to learn about disaster risk management (DRM) systems, including more effective investment in advanced DRR and DRM measures.

Session 1
Large-Scale Disasters and Countermeasures
13:30 - 15:40 (UTC+9)

Moderator

Speakers

SAKAMOTO Mayumi
Professor
Graduate School of Disaster Resilience and Governance,
University of Hyogo

ARASHIMA Chizu
Professor
Faculty of Global Communication,
Kobe Gakuin University

Saleem Shahzad Malik
Director
Disaster Risk Reduction, National
Disaster Management Authority,
Prime Minister's Office, Pakistan

Le Minh Nhat
Deputy Director
Deputy Director, Department of
Natural Disaster Response and
Recovery, Viet Nam Disaster
Management Authority (VNDMA),
Ministry of Agriculture and Rural
Development(MARD)

Serik Aubakirov
Acting Director
The Center for Emergency
Situations and Disaster Risk
Reduction (CESORR)

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Figure 2.5 Speakers of Session 1 of ACDR2022

Dr SAKAMOTO Mayumi (Professor, Graduate School of Disaster Resilience and Governance, University of Hyogo) moderated this session. She stressed the importance of improving the countermeasures for large disasters. For instance, water-related disasters, such as the unusually prolonged floods in Pakistan in 2022, are getting more frequent and intense. Earthquakes, such as those in Türkiye and Syria in February 2023,

were shown to have unknown dynamics and unpredictable occurrence. It was noted that these disasters often cross-national borders and affect people living in different countries.

Dr ARASHIMA Chizu (Professor, International and European Union Law, Faculty of Global Communication, Kobe Gakuin University) presented the issues in transboundary disaster governance from the perspective of international law. She highlighted the importance of science-based data in negotiating treaties or bilateral agreements between countries on addressing transboundary disasters.

Mr Saleem Shahzad Malik (Director, Disaster Risk Reduction, National Disaster Management Authority, Prime Minister's Office, Pakistan) presented the disaster risk reduction and climate change adaptation activities in Pakistan. In particular, the government is strengthening its disaster management system to address extreme events such as the prolonged and devastating floods in 2022. Additionally, the government has been adopting new technology in disaster risk management as well as utilizing scientific data to further enhance its disaster risk reduction strategies.

Dr Le Minh Nhat (Deputy Director, Department of Natural Disaster Response and Recovery, Vietnam Disaster Management Authority, Ministry of Agriculture and Rural Development, Vietnam) presented an overview of the disaster risk management system in Vietnam. He said that flood is the most frequent disaster in the country. To address this, major financial and structural investments have been promoted in flood control and management. In fact, Vietnam's National DRR Plan 2021–2025 puts greater priority on flood control projects.

Mr Serik Aubakiro (Acting Director, Center for Emergency Situations and Disaster Risk Reduction) introduced the roles and functions of the Center for Emergency Situations and Disaster Risk Reduction (CESDRR), which is a permanent intergovernmental body to help address transboundary disasters and emergencies. CESDRR was established through the agreement between the Government of the Republic of Kazakhstan and the Government of the Kyrgyz Republic to achieve the following objectives: 1) cooperation in disaster risk reduction, prevention, and elimination of emergency situations; 2) mitigate factors of disaster risk, identify, assess, forecast and monitor emergency situation hazards; 3) coordinate mutual efforts and strengthen preparedness for effective and timely response to emergencies; 4) implement regional and international cooperation in DRR and emergency management; and 5) increase the safety of life activities of the population during natural and man-made disasters.

Outcomes of Session 1 called for the following actions: 1) Strengthening transboundary disaster governance, such as the CESDRR initiative in Central Asia; 2) Improving the disaster risk management systems as shown in the flood disaster experience in Pakistan using science-based data on climate change; and 3) Investing more in DRR, such as the financial investment in flood control and management in Vietnam.

2.2.4 Session 2: Disaster Data Linkage: Application of GLIDE

This session reviewed the current status of disaster data management in Asia and introduced some tools and practices to effectively deal with the data from a wide range of stakeholders. It aimed at contributing to the SFDRR Target G-5: Number of countries that have accessible, understandable, usable, and relevant disaster risk information and assessment available to the people at the national and local level.

Session 2
Broaden Our Horizons for Disaster Data Linkage in SFDRR Implementation: Application of GLIDE (GLObal IDentifier Number)
 15:50 - 17:20 (UTC+9)

Moderator

Speakers

Julio Serje
 Director
 RobotSearch Software Inc.

Animesh Kumar
 Head
 UNDRR Office in Bonn,
 United Nations Office for
 Disaster Risk Reduction

Demberelnyam Baasansuren
 Director
 Disaster Risk Management
 Department (DRMD), National
 Emergency Management
 Agency (NEMA), Mongolia

Lee Chihun
 Senior Research Officer
 National Disaster
 Management Research
 Institute, Ministry of the
 Interior and Safety,
 Republic of Korea

Rajesh Sharma
 Programme Specialist (Global)
 Disaster Risk Information &
 Application, Crisis Bureau,
 Bangkok Regional Hub,
 United Nations Development
 Programme (UNDP) Bangkok,
 Thailand

Keith Paolo C. Landicho
 Disaster Monitoring and
 Analysis Officer, ASEAN
 Coordinating Centre for
 Humanitarian Assistance on
 disaster management (AHA
 Centre)

SHIOMI Yumi
 Senior Researcher
 Asian Disaster Reduction
 Center (ADRC)

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Figure 2.6 Speakers of Session 2 of ACDR2022

Mr Julio Serje (Consultant of ADRC and Director of RobotSearch Software Inc.) moderated this session. In the introduction, he emphasized the challenges relating to disaster data management in disaster risk reduction. On one hand, there are still gaps in maintaining damage and losses data. On the other hand, most of the disaster data remain aggregated. These challenges exist on top of the fact that disaster data is getting more complex, and therefore, linkages of various data management tools in the region need to be promoted.

Dr Animesh Kumar (Head, UNDRR Office in Bonn, UNDRR) reported the progress in monitoring the SFDRR. He mentioned that as of February 2023, there are already 156 countries using Sendai Framework Monitor to report on SFDRR progress. He also noted the usability of SFDRR targets and indicators such as its application in several intergovernmental processes. Meanwhile, the data has helped on SDGs reporting and are also being used by partner organizations in their thematic reports and programs Dr Kumar also added that the challenge in reporting is that developing countries, especially least developed countries (LDCs) and Small Island Developing States (SIDS), are struggling to provide data to all targets and all indicators for the SFM. To help advance monitoring, new models and tools are being developed particularly in tracking of disaster losses and damages. The new model is expected to link climate-related variables, losses and damages, and disaster events.

Mr Demberelnyam Baasansuren (Director, Risk Management Department, National Emergency Management Agency, Mongolia) presented the practices and challenges of disaster data gathering and sharing in Mongolia. These include the Spatial Information System that National Emergency Management Agency (NEMA) established in 2019 to share hazard information nationwide. She shared that barriers to disseminating the registration templates and guidance to respective stakeholders for collecting raw data are among the challenges in data gathering. In addition, there is limited human and technological capacities to provide an understanding of collecting and generating reliable data. As a way forward, NEMA will strengthen

their knowledge and understanding of data disaggregation and its importance, through training and other outreach activities.

Dr Chihun Lee (Senior Research Officer, National Disaster Management Research Institute, Ministry of the Interior and Safety, Republic of Korea) talked about the international cooperation on disaster risk reduction focusing on flood early warning systems. He highlighted their cooperation project with the Philippine government to install flood early warning systems, with emphasis on communication protocol.

Mr Rajesh Sharma, (Program Specialist (Global), Disaster Risk Information and Application Crisis Bureau, Bangkok Regional Hub of UNDP, Bangkok, Thailand) introduced UNDP's Digital Disaster Risk Reduction Maturity Model (DDRRMM). It is a diagnostic tool for the maturity of the digital ecosystem of disaster risk reduction and management practices. In developing this tool, UNDP conducted in-depth analysis of various national disaster database systems to support the new generation of disaster data and information systems in line with the level of digital maturity in countries. He highlighted the importance of digital and data governance for DRRM and the need for its promotion through legal and institutional frameworks, policies, strategies, action plans, and practical guidelines.

Mr Keith Paolo C. Landicho (Disaster Monitoring and Analysis Officer, ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management) presented the evolution of the ASEAN Disaster Information Network (ADINet), which is a repository of information concerning hazards and disasters that occurred in Southeast Asian region. ADINet has two types of linkages. One is "existing linkages" that includes linkages for validation, linkages for research application, and linkages for coverage. The other is "external linkages" that includes linkages for integration and linkages for enhancement. ADINet's linkage with GLIDE is under the linkages for integration.

Dr SHIOMI Yumi (Senior Researcher, ADRC), presented the GLIDE improvements, particularly its open governance and better functionality. In terms of governance, a steering committee was established in 2021 as well as the three subcommittees: API, SOP, and New Product Development. In terms of functionality, two new manuals were drafted. Crowdsourcing was also introduced in 2022 to allow users to report "missing disasters in the GLIDE database." Linkages of GLIDE with other disaster data management tools have been constantly coordinated, such as linkage with Reliefweb, Sentinel Asia, United Nations Satellite Centre (UNOSAT), ADINet, and ESCAP.

Outcomes of Session 2 called for the following actions: 1) Making disaster data accessible, understandable, and usable to people at the national and local levels, such as Mongolia's initiative on disaster data governance; and 2) Promoting further linkages of the disaster data management tools, which include: the new model of losses and damage tracking of UNDRR, the DDRMM of UNDP, ADINet of AHA Centre/ASEAN, and the GLIDE of ADRC.

2.2.5 Session 3: Provision of Information via Satellite for DM

This session provided an overview of the utilization of the Quasi Zenith Satellite System (QZSS) for disaster and crisis management (DC Report) and the outcomes of QZSS DC Report demonstrations in some countries.

Session 3
The Provision of Information via Satellite for Disaster and Crisis Management
 09:00 - 10:30 (UTC+9)

Moderator

Speakers

 Gerald Potutan Senior Researcher Asian Disaster Reduction Center (ADRC), Visiting Associate Professor, Kobe University	 HONGO Nobuo Deputy Director National Space Policy Secretariat, QZSS Strategy Office, Cabinet Office, Japan	 Runjie Guo GIS Engineer Social Innovation Division, NTT DATA Corporation	 Hasi Bateer Advanced Technologies Research Laboratory Infrastructure Systems, Development Center, Asia Air Survey, Co. Ltd.	 ICHIKAWA Ryunosuke Assistant Manager Social Innovation Division, NTT DATA Corporation	 Vasiti Soko Director National Disaster Management Office (NDMO), Fiji	 Socheath So Senior Technical Officer The National Committee for Disaster Management (NCDM), Cambodia
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Figure 2.7 Speakers of Session 3 of ACDR2022

Dr Gerald Potutan (Senior Researcher at ADRC and Visiting Associate Professor at Kobe University) moderated this session. He noted that in many remote, mountainous, and island areas of the Asian region, people have limited or no access to internet or cellular communications. Oftentimes, the warning information to evacuate does not reach the people at-risk. Providing the warning information via QZSS helps address this challenge as it directly transmits the message to: 1) individuals with receivers/terminals; 2) outdoor electronic facilities/boards; and 3) ground receivers that activate community alarms (e.g., siren and beam lights).

Mr HONGO Nobuo (Deputy Director, National Space Policy Secretariat, QZSS Strategy Office, Cabinet Office, Japan) explained about the Satellite Report for Disaster and Crisis Management (DC Report), which is one of the services under QZSS. With this service, disaster management agencies can provide warning information via QZSS satellites to at-risk communities, even in the absence of internet or cellular services. He added that as of December 2022, approximately 390 products are compatible with QZSS. Using some of these products (e.g., smartphone apps), demonstrations of QZSS utilization were conducted in Australia, Fiji, and Thailand.

Ms Runjie Gou (GIS Engineer, Social Innovation Division, NTT DATA Corporation) presented the outline and progress of the QZSS Project, which is jointly implemented by five partner organizations: Cabinet Office of Japan, NTT Data Corporation, Keio University, PASCO Corporation, Asia Air Survey, and ADRC. Ms Gou said that the main purpose of the project is to create a system using the QZSS DC Report service that is tailored to each country's needs and environment. It also aims to conduct QZSS DC Report Demonstrations before it officially starts operation in 2024. In the demonstrations, the project will identify requirements and issues for deployment of the system.

Dr Hasi Bateer (Hasi Lab Director, Advanced Technologies Research Laboratory, Infrastructure Systems Development Center, Asia Air Survey, Co. Ltd.) reported the outcomes of the feasibility study for disaster information system using QZSS. The study covered 21 countries in Asia and the Pacific regions and

investigated the following: 1) Conditions for receiving QZSS, 2) Specific disaster cases and issues; and 3) Early Warning System implementation needs. The outcomes highlighted information transmission issues, which includes: distortion of information as it passes through many channels; delayed arrival of information; and limited coverage of telecommunications network. In order to have an effective transmission of warning information, the study recommended that following characteristics must be present in the information system: robustness, immediacy, correctness, and comprehensiveness.

Mr ICHIKAWA Ryunosuke (Assistant Manager, Social Innovation Division, NTT DATA Corporation) presented results of QZSS validations conducted in Thailand, Fiji, and Australia.

In Thailand, the scenario was forest fire. By using QZSS, rangers can receive information directly wherever they are in the park. In Fiji, the scenario is tsunami and station devices can receive QZSS transmission and transmit it further through low power wide area network (LPWAN). In Australia, the scenario is bushfire. Information from QZSS can be received through smartphones. Following up on these promising results, the next demonstration will be intended to be more practical, which may include residents receiving messages on mobile terminals by using different communication methods (e.g., Wi-Fi, LPWAN, and Bluetooth).

Ms Vasiti SOKO (Director, National Disaster Management Office, Fiji) mentioned that one of the reasons for using QZSS in Fiji is its location in the Pacific Ocean, which is hazard-prone and has limited risk communication system. In addition, Fiji is also situated in between Vanuatu and Samoa that are also prone to disasters. Since National Disaster Management Office Fiji is strengthening its disaster management system, including early warning system, the utilization of the QZSS DC Report service in Fiji is a welcome endeavor.

Mr Socheath So (Senior Technical Officer, The National Committee for Disaster Management, Cambodia) introduced Cambodia's disaster risk management information system called, Platform for Real-time Impact and Situation Monitoring (PRISM). This platform links the field assessment information, early warning systems, satellite data, and baseline population and socio-economic vulnerability data to effectively measure the risk and its impact. QZSS is expected to augment the PRISM by providing a warning information transmission system that is tailored to the local environment.

Outcomes of Session 3 called for the following actions: 1) Promoting the provision of warning information via QZSS to directly transmit warning information to the communities at-risk; and 2) Conducting QZSS Demonstrations in countries of Asia and Pacific regions to tailor the prototype receiver according to the local environmental conditions.

2.2.6 Field Visits

Participants visited three places in Yuriage, Natori City: 1) Earthquake Reconstruction Museum, 2) Teizan Canal and Restoration Public Houses, and 3) Kawamachi Terrace Yuriage. At the Earthquake Reconstruction Museum, the Mayor of Natori City explained the facility's function as a flood defence in times of emergencies. He also noted that the population in the area initially declined after the earthquake but after promoting the town plan, the population in the area gradually increased. At the Teizan Canal and the Reconstruction Public Housing area, participants were able to see works of raising land level and the tsunami emergency evacuation site set up in the public housing. At the Kawamachi Terrace Yuriage, participants witnessed the overflowing influx of locals and tourists. They also learned about the disaster risk reduction function of the commercial center. During the field trip, some participants raised questions about the specific community

development measure and reconstruction policy implemented by Natori City and showed great interest in the reconstruction efforts in the area.



Figure 2.8 ACDR2022 participants during the field visit in Yuriage, Natori City

2.2.7 Side Event: JIPAD Seminar

One of the side events at ACDR2022 was the Japan International Public-Private Association for Disaster Risk Reduction (JIPAD) Seminar, which was organized by the Cabinet Office on March 10, 2023. Participants of ACDR2022 from member countries joined the seminar and learned about the JIPAD's initiatives, as well as introduction of DRR technologies developed by JIPAD participating companies. The main objective of the seminar was to promote Japanese disaster risk reduction (DRR) policies and technologies abroad and build DRR capacity around the world with the aim of contributing to the achievement of SFDRR and the SDGs. The JIPAD Seminar showcased Japanese technologies pertaining to: 1) road development, 2) housing constructions, 3) multi-purpose helicopters, 4) earthquake sensors, and 5) radio communication systems to further enhance disaster management.

Pre-event of ACDR 2022
JIPAD Seminar
 Hosted by the Cabinet Office of JAPAN
 Friday, 10 March 2023, 11:30-13:00 (JST)
 Sendai International Center Conference Building 3F "Shirakashi" and Zoom

Agenda

11:30	Opening Remarks by the Cabinet Office of Japan
	Part 1: Opening Speech
11:35	The AHA Centre Mr. Dipo Summa, Resource Mobilisation Manager
11:50	Q&A
	Part 2: Presentation by JIPAD Companies
12:05	Sakai Heavy Industries, Ltd
12:15	Urban Renaissance Agency
12:25	Kawasaki Heavy Industries, Ltd.
12:35	Challenge Co., Ltd.
12:45	JVCENWOOD Corporation
12:55	Closing Remarks

Registration for joining via Zoom: <https://bit.ly/acdr2022>

Figure 2.9 Agenda of the JIPAD Seminar

2.3 Report on Türkiye-Syria Earthquakes 2023

Türkiye is a member of ADRC since 2018 with the AFAD as the counterpart agency. Following the earthquakes that occurred on 6 February 2023, ADRC coordinated various actions. A brief report of these activities is available on the website: https://www.adrc.asia/publications/disaster_report/index.php

2.3.1 Issuance of GLIDE numbers

GLIDE numbers for the earthquakes that occurred on 6 February 2023 were issued as follows:

- Türkiye: [EQ-2023-000015-TUR](#)
- Syria: [EQ-2023-000015-SYR](#)

With the GLIDE numbers issued, all information related to these earthquakes are integrated.

2.3.2 Satellite imageries

Below are some satellite imageries that ADRC requested from Sentinel Asia on behalf of AFAD. The satellite imageries were analyzed and AFAD utilized it for disaster response, including assessment of impacts.

These emergency observation satellite imageries are available online: <https://sentinel-asia.org/EO/2023/article20230206TR.html>.

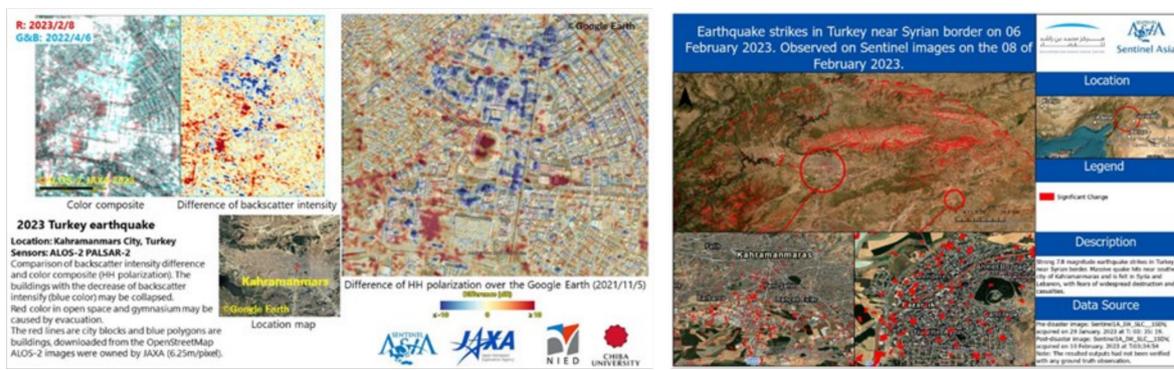


Figure 2.10 Satellite imageries of the 2023 Türkiye Earthquakes from Sentinel Asia

2.3.3 Assessments

ADRC initially gathered impact assessment of the Türkiye-Syria earthquakes, including those presented at the ACDR2022 on 11 March 2023, which includes:

- The main shock occurred close to the border of Türkiye and Syria
- 11 out of 81 provinces in Türkiye were affected by the earthquakes
- Total population of the 11 earthquake-affected provinces is 14,013,496 (which is 16.4% of the national population of 85,279,553 people)
- AFAD, with the support of World Bank (WB), UNDP, and European Union (EU), published the Post Disaster Needs Assessment (PDNA) on 23 March 2023 <https://www.sbb.gov.tr/wp-content/uploads/2023/03/Turkiye-Recovery-and-Reconstruction-Assessment.pdf>

Province	Total
Adana	2,274,106
Adiyaman	635,169
Diyarbakir	1,804,880
Elazığ	591,497
Gaziantep	2,154,051
Hatay	1,686,043
Malatya	812,580
Kahramanmaraş	1,177,436
Şanlıurfa	2,170,110
Kilis	147,919
Osmaniye	559,405
Total Region	14,013,196
Men	7,049,219
Women	6,963,977
Total Türkiye	85,279,553
Men	42,704,112
Women	42,575,441

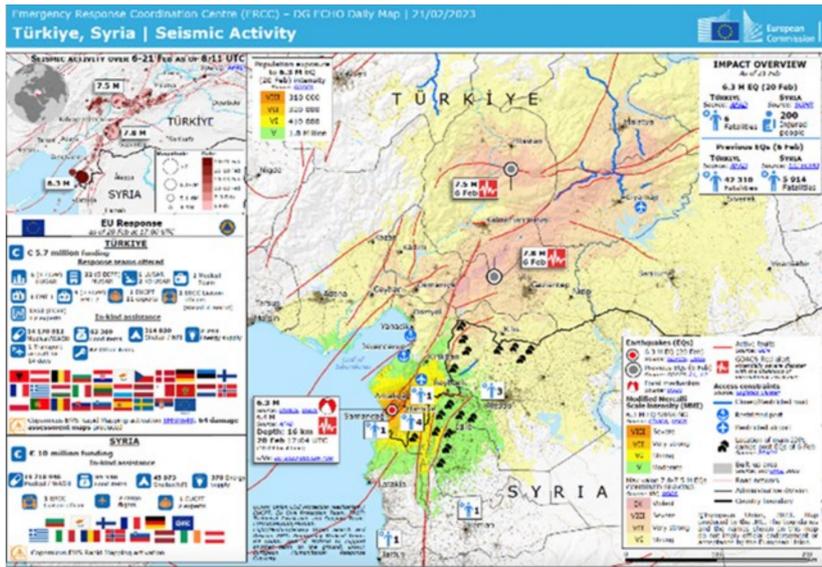


Figure 2.11 List of Provinces affected and the Seismic Activity map of the 2023 Türkiye-Syria Earthquakes

2.4 Tsunami Seminar 2022

With the theme, “Understanding Tsunami Risk and Enhancing Practical Countermeasures”, ADRC organized an online tsunami seminar on 15 June 2022. The seminar was aimed at improving knowledge on tsunami risk, especially with regard to non-earthquake sources of tsunami. Outcomes of the seminar provided insights on augmenting physical countermeasures (e.g., levees) and improving practical countermeasures at the community level (e.g., awareness-raising, actionable early warning, and simple evacuation procedures). Speakers in this seminar, were:



Figure 2.12 Speakers of ADRC Online Tsunami Seminar 2022

(1) Dr Teuku Alvisyahrin, Professor at Syiah Kuala University and Former Head of Professional Services Division of the Tsunami and Disaster Mitigation Research Center, Banda Aceh, Indonesia; (2) Mr Somneuk Swatteuk, Disaster Early Warning Specialist at the National Disaster Warning Center of the Department of Disaster Prevention and Mitigation, Ministry of Interior in Thailand; and (3) Mr ARAKIDA Masaru, Director of the Research Department of ADRC, Kobe, Japan. Dr Gerald Potutan, Senior Researcher at ADRC, served as moderator while Mr NAKAGAWA Masaaki, Executive Director of ADRC, provided synthesis of the discussions. Below is a list of messages from the event:

- Tsunami risk is dynamic. As shown in the experiences of Thailand and Indonesia, tsunami risk can increase or decrease depending on the community's ability to reduce vulnerability.

- Practical countermeasures need to be scaled-up to enhance community resilience. It is important to exchange experiences in practical countermeasures (e.g., how to evacuate the pregnant, disabled, and elderly during tsunami) so that communities can further learn and improve their efforts.
- Space-based technology augments response efforts during tsunami disaster. Satellites imageries during the Great East Japan Earthquake were valuable in assessing tsunami disaster impacts by comparing before and after photos.

Through this seminar, information about tsunami risk were greatly understood. Hence, ADRC will continue sharing Tsunami DRR experiences and lessons to pass on to the next generation.

2.5 Workshop at the BOSAI KOKUTAI 2022

Within the context of the BOSAI KOKUTAI 2022, ADRC organized a workshop on 22 October 2022 entitled, “Differences in Disaster Risk Management (DRM) between Japan and other countries as seen by foreign residents: Cooperation starts from understanding the differences.” Speakers at the workshop discussed a range of issues, including the engagement of foreign residents in disaster prevention activities, risk communication, and ways to bridge the differences in DRM practices among Asian countries.

Dr Khaerunnisa (Head, Master of the Architecture Program, University of Atma Jaya Yogyakarta, Indonesia), a former foreign student in Osaka, pointed that in Japan, foreign students can organize themselves to establish a network of support and disaster information from mass media, TV, the internet, and radio are readily accessible to foreign students. By contrast, in Indonesia, government agencies facilitate the organization of community networks (including student networks) to build a strong support system in times of disaster.



Figure 2.13 Participants of ADRC Workshop at the BOSAI KOKUTAI 2022

Mr NAGANO Koichi (Director, Policy Planning and Coordination Department, Hyogo International Association) highlighted Hyogo International Association's (HIA) efforts to support foreign residents during disasters. Among the efforts he mentioned were: 1) a multilingual bulletin board, aimed at providing information on disaster preparation and evacuation in times of disaster; 2) a Disaster Preparedness Guide for Children and Parents, which is to be disseminated to all residents; and 3) the My Evacuation Card, a card that provides simple instructions for evacuation in nine different languages.

Mr MAMIYA Keita (Risk Management Section Officer, Policy Department, Kusatsu City, Shiga Prefecture) shared Kusatsu City's pioneering program of organizing "Foreign Firefighters." During normal times, foreign firefighters receive training and participate in disaster risk reduction activities, including seminars and lectures. During emergencies, foreign firefighters also help in disseminating information via social media, support safe evacuation, and assist in counselling using their respective native languages.

Dr Gerald Potutan (Senior Researcher, ADRC) presented the results of an online survey that looked into the differences in DRM practices between Japan and other countries. The study showed that foreign residents perceived Japan's DRM practices (e.g., hazard maps, disaster drills, evacuation guidance, and early warnings) to be "excellent" compared with their respective countries of origin. The study also showed that "language barrier" hinders risk communication. So, the use of visual tools (e.g., images, drawings, and signs); reaching out to foreign residents early on (e.g., during arrival and registration) regarding disaster preparedness; and enhancing multilingual services (e.g., offering translations and subtitles in more languages) are among the actions that the respondents recommended.

In closing, Mr ARAKIDA Masaru (Director, Researcher Department, ADRC), who moderated the workshop, acknowledged that since foreign residents in Japan come from diverse cultures and backgrounds, Japanese local governments can experience difficulties in communicating disaster risk. He said that the outcomes of the workshop can offer insights on how to address this challenge. He also mentioned that all workshop materials would be made available on the ADRC website at: <https://www.adrc.asia/workshop/2022bosaikokutai.php>.

Asian Disaster Reduction Center
Side Event Workshop at the BOSAI KOKUTAI 2022

Differences in DRM between Japan and other countries as seen by foreign residents in Japan
– DRM cooperation starts from understanding the differences –

22 October 2022
15:30 - 16:30
(Japan Time UTC+9)

Venue
3rd Floor at JICA Kansai,
Seminar Room No.33 • 34
1-5-2 Waburohama Kagadori, Chuo-ku,
Kobe City, Hyogo Prefecture 651-0873

Registration
For registration, please scan this QR code or visit the link below and fill out the registration form

➤ In - person registration form
<https://bit.ly/BK2022ADRC2>

*Applications will be closed when the maximum number of participants reaches 50.

➤ Online registration from
<https://bit.ly/BK2022ADRC>

Speakers
Khadrun Nisa, PhD
Head
Master of Architecture
Programme, University of Airlia
Jayabaya, Yogyakarta, Indonesia

Speaker
Mr NAGANO Koichi
Director
Policy Planning and Coordination
Department, Hyogo International
Association (HIA)

Speaker
Mr MAMIYA Keita
Officer
Risk Management Section, Policy
Department, Kusatsu city, Shiga
Prefecture

Speaker
Gerald Potutan, PhD
Senior Researcher
Research Department, Asian Disaster
Reduction Center (ADRC)

Moderator
Mr ARAKIDA Masaru
Director
Research Department, Asian
Disaster Reduction Center (ADRC)

Contact us
ADRC Secretariat email address: bosai_kokutai2022@adrc.asia
ADRC Website: <https://www.adrc.asia>

Figure 2.14 Flyer of the Workshop at the BOSAI KOKUTAI 2022

3. Information Sharing on DRR

3. Information Sharing on DRR

ADRC shares disaster risk reduction (DRR) information, including those on ADRC website <https://www.adrc.asia/latest/>, to member countries and the general public. Information shared online includes documented experiences, lessons, tools, practices, and analyses of data that are useful for preparedness, mitigation, response, and recovery activities.

3.1 Information Collection

Basically, ADRC collects the following types of DRR information through the contributions and reports from member-countries, partner organizations, and networks:

- Disaster risk management systems (e.g., legal and institutional frameworks, disaster management plans, and manuals)
- Disaster response and recovery activities (e.g., emergency response activities in affected area/country)
- Disaster events due to natural hazards (e.g., descriptions of natural disasters such as earthquakes, floods, cyclones, and so on, and the damages)

The Visiting Researchers (VRs) and the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) play important role in the information collection.

3.1.1 Country Reports on DRR

Member countries regularly provide an updated Country Report to ADRC, which include information about natural hazards, disaster management systems, DRR strategy/plan, recent disasters, and progress in implementing the Sendai Framework for Disaster Risk Reduction. Table 3.1 shows the updated record for FY2022.

Table 3.1. List of reports from ADRC member countries

Country	Year prepared (Update frequency is different as it is made by VRs of the year.)
Armenia	2001, 2002, 2003, 2005, 2006, 2010, 2012, 2015, 2016, 2017, 2021, 2022
Azerbaijan	2011, 2014
Bangladesh	1998, 1999, 2001, 2003, 2005, 2006, 2010, 2011, 2013, 2020, 2021
Bhutan	2008, 2013, 2014, 2017, 2019
Cambodia	1998, 1999, 2002, 2003, 2005, 2006, 2013
China	1998, 1999, 2005, 2006, 2012
India	1998, 1999, 2002, 2005, 2006, 2008, 2012, 2015, 2018, 2020, 2022
Indonesia	1998, 1999, 2002, 2003, 2004, 2005, 2006, 2012, 2016
Iran	2013
Japan	1998, 1999, 2002, 2005, 2006, 2012, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022

Country	Year prepared (Update frequency is different as it is made by VRs of the year.)
Kazakhstan	1998, 1999, 2002, 2005, 2006
Republic of Korea	1998, 1999, 2001, 2002, 2005, 2006, 2008
Kyrgyz Republic	2005, 2006, 2012
Lao PDR	1998, 1999, 2003, 2005, 2006
Malaysia	1998, 1999, 2003, 2005, 2006, 2008, 2009, 2011, 2018
Maldives	2013, 2014, 2015, 2018
Mongolia	1998, 1999, 2002, 2005, 2010, 2011, 2013, 2021, 2022
Myanmar	2002, 2005, 2006, 2013, 2018, 2020, 2021, 2022
Nepal	1998, 1999, 2005, 2006, 2009, 2010, 2011, 2014, 2019
Pakistan	2005, 2006, 2009, 2015, 2016, 2017, 2021, 2022
Papua New Guinea	1998, 1999, 2005, 2006
Philippines	1998, 1999, 2002, 2003, 2005, 2006, 2009, 2010, 2011, 2012, 2014, 2016, 2017, 2018
Russia	1998, 1999, 2003, 2005, 2006
Singapore	1998, 1999, 2001, 2002, 2003, 2005, 2006
Sri Lanka	1998, 1999, 2003, 2005, 2006, 2009, 2010, 2011, 2014, 2015, 2016, 2019
Tajikistan	1998, 1999, 2003, 2005, 2006
Thailand	1998, 1999, 2003, 2004, 2005, 2006, 2008, 2010, 2011, 2012, 2016, 2017, 2018, 2019, 2020, 2021, 2022
Türkiye	2019
Uzbekistan	1998, 1999, 2005, 2006, 2013, 2015
Viet Nam	1998, 1999, 2005, 2006, 2017, 2021, 2022
Yemen	2009, 2012, 2014

3.1.2 Latest Disaster Information (FY2022)

Information on the latest disaster is immediately posted on ADRC website (Figure 3.1). Every latest disaster information contains: date of occurrence, location, impacts, and links to reports, articles, maps, relief efforts, and satellite images. ADRC is able to compile a comprehensive information of each disaster event due to its wide range of reliable partners that provide the data. As of 28 February 2023, ADRC registered a total 2,595 disaster information items in the database.

The screenshot displays the ADRC website interface. On the left, under 'Latest Disaster Information', there are four entries:

- Japan: Heavy rain** (2023/06/02): Heavy rain lashed wide areas of Japan on 2 June 2023 including in Kyushu, Kansai, Tokai and Kanto, with authorities urging residents of nearly 1.3 millions to be advised to evacuate. The active rain front, as well as moist air carried by Tropical Storm Mawar as it moves through the Pacific south of Japan, brought heavy rain in areas from Shikoku to Tokai along the Pacific coast.
- Philippines (the): Typhoon** (2023/05/29): According to the forecast from PAGASA on 29 May 2023 at 1000 HRS UTC+7, Tropical Cyclone (TC) MAWAR (local name: Betty), currently as a typhoon category, slightly decelerates while moving northwestward over the waters east of Cagayan. As of 29 May, the NDRRMC reported the following: 1.17K families (4.6K persons) affected in 15 barangays
- Bangladesh: Tropical Cyclone** (2023/05/11): Cyclone Mocha has hit the coastal areas along the Bangladesh-Myanmar border on 14 May 2023 at around 15:00 hrs, bringing heavy rainfall, strong winds, and causing landslides in some areas.
- Myanmar: Tropical Cyclone** (2023/05/11): On 14 May 2023, Tropical Cyclone Mocha, with wind speeds of about 250 km/h, made landfall on the coastal areas from Rakhine State, Myanmar to Cox's Bazar District, Bangladesh, displacing over 100,000 people in Myanmar. Damage is extensive and may further escalate in the future.

 On the right, under 'What's New', there is a banner for 'Tsunami Preparedness Day November 5th' with the text 'Implementation of disaster prevention drills. We hold symposiums and so on.' Below this are three sections:

- Newsletter**: ADRC Highlight vol.362 [English] and ADRC Highlight vol.359 [Russian]
- Publications 2022/12/09**: NEW! [Annual Report] ADRC Annual Report 2021 >>Read more
- Publications 2022/12/09**: NEW! [Databook] Natural Disasters Data Book-2021 edition >>Read more
- Events 2023/03/11**: NEW! Asian Disaster Reduction Center (ADRC) organized the Asian Conference on Disaster Reduction 2022 (ACDR2022) on 11-12 March 2023 in Sendai, Japan. >>Read more
- Events 2022/10/22**: As a side event of the "BOSAI KOKUTAI 2022", ADRC organized a workshop titled "Differences of DRM in Japan as seen by Foreign Residents in Japan - DRM Cooperation Starting from Understanding the Differences -". >>Read more

Figure 3.1 Latest Disaster Information on ADRC Website

The three most notable disasters in FY2022, as registered in the database, are:

- **Türkiye Earthquakes, 6 February 2023**

Türkiye was hit by a series of debilitating earthquakes in February 2023. It caused the deaths of 50,090 people and over 3.3 million people were displaced. Most of apartments and houses across a vast territory of 110,000 km² collapsed. Considering the disaster damages and losses, it was estimated that the total financial burden amounting to 103.6 billion USD, which is equal to 9% of GDP forecast for 2023, is needed for recovery (GLIDE number: [EQ-2023-000015-TUR](#)).

- **Tropical Storm Nalgae (Paeng) in the Philippines, 27 October 2022**

Tropical storm Nalgae (locally named Paeng) made landfall on 29 October 2022 in Catanduanes, Philippines. About 6 million people were affected, 164 dead, 28 missing, and 270 injured. Estimated damage to infrastructure was about 107 million USD (PHP 6 billion). TS Nalgae totally damaged 6,634 houses and partially damaged 61,788 other houses. (GLIDE number: [TC-2022-000352-PHL](#))

- **Floods in Pakistan, June–July 2022**

Heavy rains impacted multiple areas for weeks since June 2022. Downpour wreaked havoc in Khyber Pakhtunkhwa (KP), Balochistan, and parts of Sindh, where the local administration faced challenges in dealing with the emergency. Prolonged flooding caused severe impacts, including the deaths of 1,678 people. It also injured 12,864 and affected 33,046,329 in 84 districts. About 767,488 houses were fully destroyed while 1,277,861 houses were partially destroyed (GLIDE number: [FL-2022-000270-PAK](#)).

3.1.3 Natural Disaster Databook

ADRC retrieves and analyzes natural disaster data from the Emergency Events Database (EM-DAT) to better understand the occurrence, deaths, people affected, and economic losses of disaster events. The Natural Disaster Databook 2021 (Figure 3.2) contains analytical overview of disaster data that are shown in graphs with textual explanations. For instance, in analyzing climate-related disasters (particularly flood, storm, and drought), the data shows an increasing trend of occurrences of storm and flood since the last 30 years from 1991. Not only that, the impacts of climate-related disasters are also becoming more destructive, accounting for the highest number of people affected as well as economic losses both in the last 30 years (1991–2020) and in 2021, signifying a continuing trend (Figure 3.3).

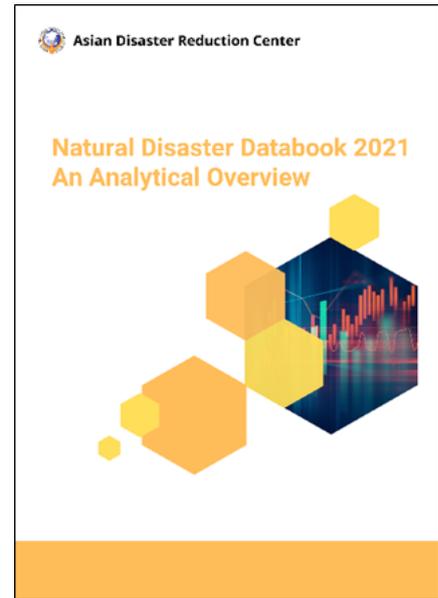


Figure 3.2 Cover of Natural Disaster Databook 2021



Figure 3.3 Data showing that climate-related disaster affected more people and causing greater economic losses

In 2021 alone, extreme cold waves (e.g., France in April) and heat waves (e.g., Canada in July) were recorded in many parts of the world. In Asia in 2021, aside from heat wave, India was severely impacted by floods and cyclones, affecting more than 18 million people. Bangladesh and Nepal were hit by floods that impacted millions of people. Floods affected 14 million people in China and over 1 million people in Indonesia. Furthermore, drought has been affecting millions of people during the past 30 years, and it incurred economic losses affecting more than 28 million people in Asia in 2021 alone.

3.2 Information Dissemination

ADRC disseminates DRR information using a range of channels, including: a) regular issuance of ADRC Highlights, a monthly newsletter, b) dissemination via GLIDE, and c) dissemination through Sentinel Asia and space-based platforms.

3.2.1 ADRC Highlights

Every month, the latest issue of the newsletter is uploaded on the ADRC website. Its text version is emailed to all subscribers in three different languages immediately after publication. As of 28 February 2023, the total number of the newsletter subscribers is 3,831 with 2,668 subscribers for English language, 224 subscribers for Russian language, and 939 subscribers for Japanese language. comprise the mailing list. In FY2022, the contents of the newsletter included articles on the latest ADRC activities (including the VR program), the Asian Conference on Disaster Reduction 2022, reports on participation in international conferences, and other events which ADRC staff members attended or gave presentations.



Figure 3.4 Front page of ADRC Highlights Vol. 36, April 2023

3.2.2 Data Sharing through GLIDE Number System

As of March 2023, over 7,700 GLIDE numbers have been issued. A GLIDE number (e.g., [EQ-2023-000015-TUR](#)) comprises the following components: disaster classification (24 types), year of occurrence, serial number in one year, and country code. Once a disaster occurs, an operator issues a GLIDE number by inputting disaster information such as location, time, disaster type, and initial damage and then uploaded on the GLIDE website. The number is automatically sent to its over 2,000 subscribers. GLIDE is linked with other disaster data management tools, including those tools at Reliefweb, Sentinel Asia, UNOSAT, ADINet, and ESCAP. Moreover, GLIDE’s governance and function has been updated. In terms of governance, a steering committee was established in 2021 as well as the three subcommittees: API, SOP, and New Product Development. In terms of functionality, two new manuals were drafted and crowdsourcing was introduced in 2022 to allow users to report “missing disasters in the GLIDE database.”

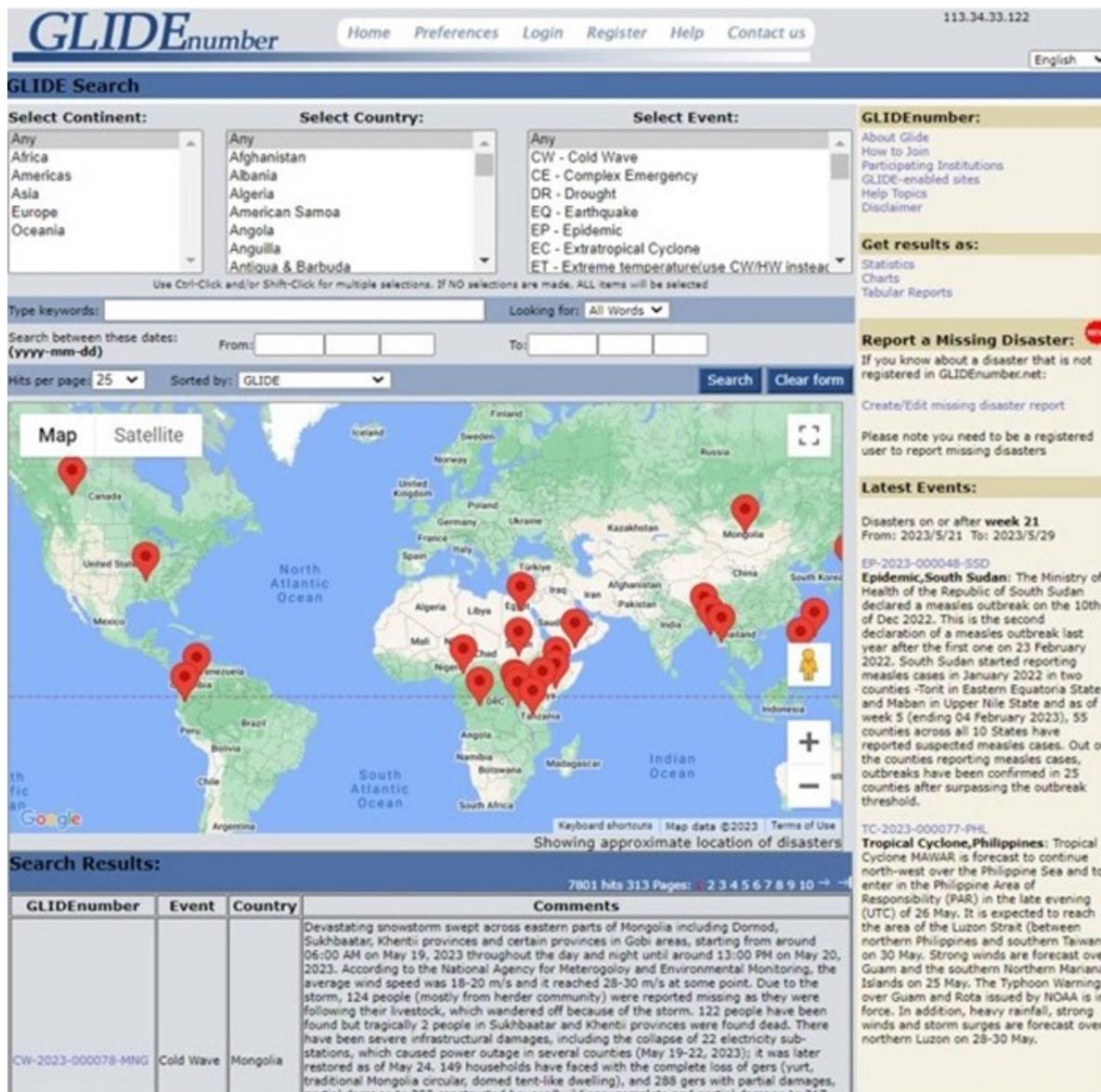


Figure 3.5 Homepage of GLIDE website

3.2.3 Data Sharing through Sentinel Asia

In FY2022, Sentinel Asia received 28 requests from the Joint Project Team (JPT) members and all 28 requests were activated (Figure 3.6). On behalf of its member countries, ADRC forwards the emergency observation request to seven space agencies under Sentinel Asia: ISRO (India), JAXA (Japan), MBRSC (United Arab Emirates), STI/VAST (Vietnam), GISTDA (Thailand), NARL (Taiwan), and CRISP (Singapore). Through the emergency observation satellite imageries, Sentinel Asia supports disaster management activity in the Asia-Pacific region by applying space-based technology (i.e., earth observation satellites data) and WEB-GIS technology. As of January 2023, the JPT membership comprises 112 organizations from 28 countries.

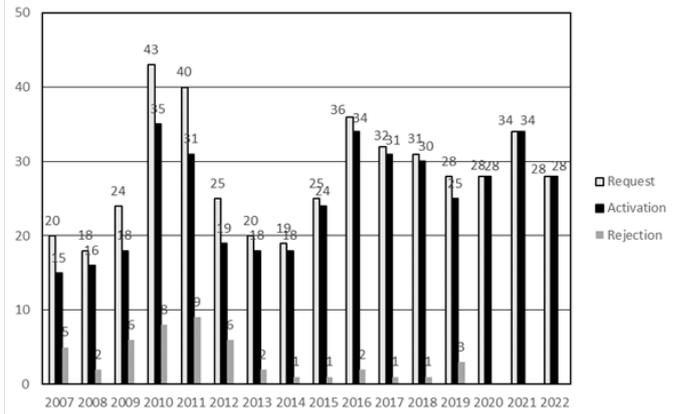
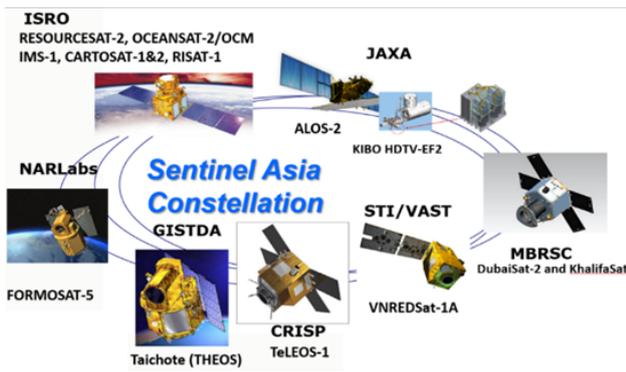


Figure 3.6 Data Provider Nodes and Emergency Observations Records, 2007–2022

4. Human Resource Development

4. Human Resource Development

ADRC enhances the DRM capacities of member countries through the visiting researchers (VR) program, seminars, workshops, training events, and other DRR related human resource development activities.

4.1 Visiting Researchers Program

As of March 2023, an accumulated total number of 126 officials from 27 countries have participated in the VR program since it started in 1999. Under this program, VRs are invited to Japan to conduct their respective DRR researches with the opportunity to participate in relevant events as well as visit organizations. It enables VRs to compare and learn from different DRM systems.

4.1.1 Activities During the Program

The VR program is aimed not only to strengthen the disaster response capabilities of member countries but also to further enhance cooperation between member countries and ADRC. In FY2022, seven visiting researchers (including those from the FY2021 who could not come to Japan due to COVID-19 pandemic) were invited to participate in the on-site training in Japan. During their stay, the VRs learn about innovative and practical DRR efforts and technologies and gain knowledge about cooperation and collaboration with national governments, international organizations, and DRR agencies.

4.1.2 Research Topics

On 29 March 2023, all 7 VRs presented the outcomes of their research activities. Overall, the final reports reflected the accumulation of DRR knowledge, the characteristics of latest disasters and disaster management policies/laws/plans/budget, and the measures to strengthen resilience. The titles of their respective researches are as follow:

- Seismic monitoring, seismic hazard, risk assessment, and earthquake early warning system implementation as part of seismic risk reduction (Armenia)
- Preparedness for Disaster Response in Japan (India)
- A study on the issues to be considered in improving the requirements for evacuation shelter during disaster (Mongolia)
- Study on Community Based Disaster Preparedness and Prevention Activities in Japan (Myanmar)
- Tsunami response plan for the coastal areas of Pakistan and livelihood improvement along with other scalable DRR interventions for the coastal areas (Pakistan)
- Developing a National Disaster Risk Reduction Plan (Thailand)
- Community-based disaster risk management in Japan: A lesson learned (Vietnam)



Figure 4.1 Visiting Researchers during one of their site visits in Japan

In conducting their research activities, ADRC assigned a mentor to each VR to guide and assist in the entire process.

4.1.3 Networking of Visiting Researchers

ADRC taps the network of former VRs to cooperate in various ongoing projects, particularly for effective and efficient implementation. Additionally, VRs are tapped to design new projects that meet the local conditions. Furthermore, former VRs are contacted whenever ADRC intends to suggest policy updates or extends support to their respective home countries based on the request or information they provided. New VRs are encouraged to contact former VRs to establish communication, share experiences, and insights. Every year, some former VRs participate in the ACDR, where they make presentations.

During the ACDR2022, 10–12 March 2023, two former VRs participated: 1) Mr Baasansuren DEMBERELYNAM from Mongolia reported on the government’s recent efforts for strengthening the disaster statistics to hasten the implementation of the SFDRR in Mongolia; and 2) Ms Syuzanna Kakoyan from Armenia also actively participated in the conference.

Armenia	9
Azerbaijan	2
Bangladesh	6
Bhutan	4
Cambodia	4
China	3
India	8
Indonesia	3
Iran	1
Kyrgyz Republic	2
Lao PDR	2
Malaysia	4
Maldives	4
Mongolia	6
Myanmar	5
Nepal	9
Pakistan	6
Papua New Guinea	1
Philippines	9
Republic of Korea	3
Sri Lanka	11
Tajikistan	2
Thailand	11
Türkiye	1
Uzbekistan	2
Viet Nam	5
Yemen	3
Total	126

Figure 4.2 Accumulated total number of VRs as of March 2023



Figure 4.3 Former VR from Mongolia (left) and Armenia (right) during the ACDR2022

4.2 JICA Knowledge Co-creation Program

Under the Knowledge Co-Creation Program, JICA commissioned ADRC to conduct comprehensive training courses on DRR, which are designed based on themes of interests in each region/country. In FY2022, a total of six training courses were implemented: 1) Comprehensive DRR for Central and South America, 2) Comprehensive DRR for African Region, 3) Comprehensive DRR for Central Asia and Caucasus, 4) Promotion of Mainstreaming DRR, 5) Comprehensive DRR Course, and 6) Strengthening DRR Capacity for Malaysia.

4.2.1 Comprehensive Disaster Risk Reduction for Central and South America

Duration: 24 May – 8 Jul 2022 (online)

Number of Participants: 18 (from 10 countries)

Contents: DRR in Japan, 8 Steps in formulating local DRR strategy

This course was attended by 18 participants from 10 countries: Colombia, Dominican Republic, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, and Peru. During the seven-week program, the participants attended lectures on disaster countermeasures and exercises around local DRR plans, and drafted plans for their target municipalities. They actively engaged in developing DRR measures to reduce humanitarian and economic losses from disasters.



Figure 4.4 Mr ARAKIDA Masaru of ADRC giving lecture on the 8 Steps in Formulating Local DRR Strategy

4.2.2 Comprehensive Disaster Risk Reduction for African Region

Duration: 22 Aug – 29 Sep 2022 (online)

Number of Participants: 7 (from four countries)

Contents: DRR in Japan, 8 Steps in formulating local DRR plan

The JICA Knowledge Co-Creation Program entitled, "Comprehensive Disaster Risk Reduction for the African Region" was conducted online from 22 August to 29 September 2022, with the cooperation of JICA Kansai. It was attended by seven government officials from four countries: Democratic Republic of the Congo, Malawi, Senegal, and Cabo Verde. This course focused on flood and sediment disasters. Participants studied disaster countermeasures for their target cities by attending lectures on each disaster and participating in exercises to formulate a draft local DRR plan. They all worked so hard during this course, not only acquiring knowledge and skills but also developing their relationships with one another. Some organizations and universities in Japan contributed to the success of this course.

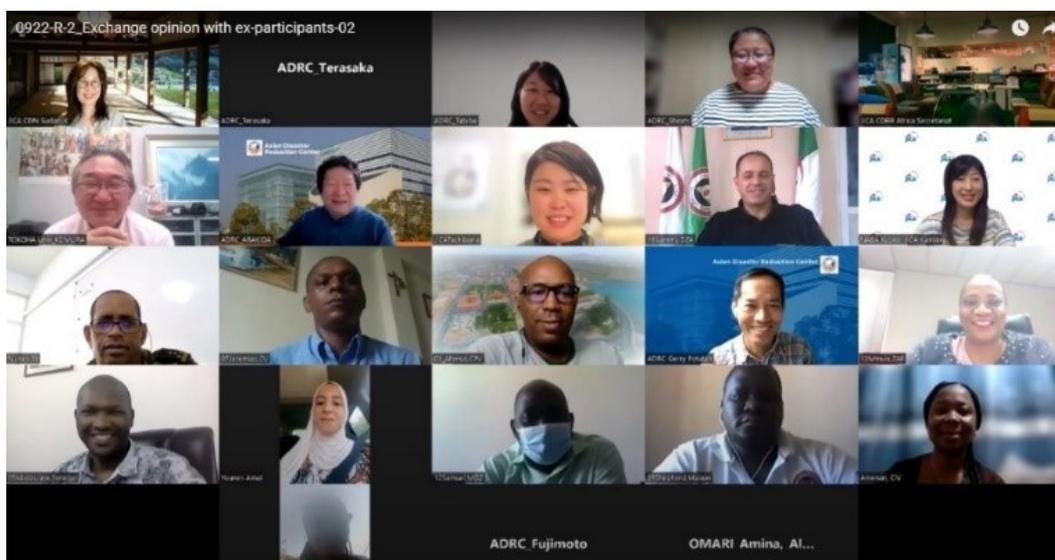


Figure 4.5 Screenshot of Online Training for the African Region

4.2.3 Comprehensive DRR for Central Asia and the Caucasus

Duration: 10 Nov – 9 Dec 2022 (in-person)

Number of Participants: 7 (from four countries)

Contents: DRR in Japan, 8 Steps in formulating local DRR plan

The training course, "Comprehensive Disaster Management for Central Asia and Caucasus" was conducted from 10 November to 9 December 2022. This program was designed for disaster management administrators in the Central Asia and Caucasus region with the aim of strengthening the capacity of government agencies primarily responsible for disaster management so as to mitigate human impacts and economic damages caused by natural disasters. With a particular focus on the formulation of priority DRR measures, the program aimed to deepen understanding of the importance of such measures, to promote strategic DRR investments in each country, and to promote the implementation of DRR measures that reduce residual risks. The

program also aimed to help participants learn how to draft and implement local DRR plans. Due to the spread of COVID-19 pandemic, the training program was temporarily suspended and subsequently conducted online, but in-person training resumed in 2022 for the first time in three years. A total of seven participants from Armenia, Kazakhstan, Kyrgyz Republic, and Tajikistan took part in the five-week program. The training consisted of in-person and online lectures, visits to DRR facilities, mainly in Hyogo Prefecture but also in the Tokyo area, and a workshop on designing local DRR plans. Each participant enthusiastically participated in the lectures and exercises, and presented a draft local DRR plan on the final day to successfully complete the course. The knowledge, skills, and methodologies acquired through this training will be applied to disaster risk management in the participants' home countries.



Figure 4.6 Trainees from Central Asia and Caucasus visited DRR facilities

4.2.4 Promotion of Mainstreaming Disaster Risk Reduction

<u>Duration:</u>	12 – 24 Dec 2022 (in-person)
<u>Number of Participants:</u>	5 (from three countries)
<u>Contents:</u>	DRR in Japan, 8 Steps in formulating local DRR plan



Figure 4.7 Participants from Bangladesh, Indonesia, and Mexico during the training in Japan

ADRC conducted the JICA Knowledge Co-Creation Program entitled, "Promotion of Mainstreaming Disaster Risk Reduction" from 12–24 December 2022 in cooperation with JICA Kansai. It was attended by five management-level DRR agency officials from three countries: Bangladesh, Indonesia, and Mexico. This program was aimed at achieving the following: sharing the concept of mainstreaming DRR, incorporating DRR in development policies, and promoting the methods of mainstreaming DRR at the policy level. It was also aimed at sharing various experiences from Japan and examine the strategies and approaches for

promoting the mainstreaming of DRR in participants' home countries. During the two-week program, participants attended lectures, site visits, and discussions on disaster countermeasures. Participants actively engaged in DRR measures to reduce humanitarian and economic losses due to disasters.

4.2.5 Comprehensive Disaster Risk Reduction Course

Duration: 28 Dec 2022 – 22 Feb 2023 (in-person)

Number of Participants: 8 (from six countries)

Contents: DRR in Japan, 8 Steps in formulating local DRR plan

The training entitled, "Comprehensive Disaster Risk Reduction" was conducted from 28 December 2022 to 22 February 2023 in cooperation with JICA Kansai. It was conducted in a hybrid format, with both online and in-person programs in Japan. It was attended by eight government officials from six countries: Bangladesh, Brazil, Indonesia, Nepal, Sri Lanka, and Thailand. This course was aimed at helping participants learn how to formulate and implement local DRR plans to promote disaster reduction measures in each country. Participants studied disaster countermeasures for their target cities by attending lectures, site visits, and participating in exercises on formulating a draft local DRR plan. They all participated enthusiastically in the programs, engaging in discussions with other participants and deepening their understanding of the subject matter.



Figure 4.8 Trainees visited flood control facilities along Shirakawa River, Kumamoto

4.2.6 Strengthening Disaster Risk Reduction Capacity for Malaysia

Duration: 6 – 10 Mar 2023 (in-person)

Number of Participants: 15 (from Malaysia)

Contents: DRR in Japan, 8 Steps in formulating local DRR plan

ADRC conducted the JICA Knowledge Co-Creation Program, "LEP2.0 Enhancement of the Disaster Risk Management Capacity of the National Disaster Management Agency", on 6–10 March 2023. The course was aimed at improving the technology and coordination capacity of the Malaysian National Disaster Management Agency (NADMA) to realize a disaster-resilient society in the country. A total of 15 officials from related organizations, mainly from NADMA, participated in this first training. After the orientation on the first day of the training, participants made presentations for their



Figure 4.9 Participants from Malaysia during lectures at JICA Kansai

organization, and it was followed by discussions to confirm the training objectives and points at each site. From the second day onwards, the participants visited several sites that showcase flood and sediment disaster countermeasures. On the final day of the training, synthesis of lessons learned were presented, as well as the next steps.

4.3 Short-Term Programs

Short-term programs in FY2022 included internship, KOBE Global Challenge with Kobe University, and Try-Yaru.

4.3.1 Internship at ADRC

- Mr Kier Hamilton, 1 July – 31 Aug 2022

ADRC accepted Mr Kier Hamilton for online internship at the Research Department from 1st July to 31st August 2022. He spent 100 hours performing substantive analysis of disaster data from EM-DAT and other related sources for the Natural Disaster Databook, an annual publication of ADRC. Mr Hamilton is a Masters student in Disaster Risk Management and Climate Change Adaptation at Lund University, Sweden. His analysis of the natural disaster data showed that hazards have increased in frequency and severity, and Asia is the worst affected continent. The most common disaster events were floods and storms, with both becoming more common as climatic changes take place. He said that working with the ADRC team is a memorable experience that allowed him to expand his knowledge and improve his understanding of the disaster landscape.



Figure 4.10 Mr Keir Hamilton
(Intern)

- Mr Jhumar Sioson, 21 October – 2 November 2022

Mr Jhumar Sioson, a master's degree student in the field of Environmental Studies at Nagoya University, served as an intern at ADRC as part of the Global Research Internship (GRI) of Nagoya University. GRI provides research-based internship opportunities to students to help them acquire practical research know-how through on-site research training. During his in-person internship, Mr Sioson assisted in organizing the workshop, 7th BOSAI KOKUTAI, engaged in DRR Town-Watching in Nada, Kobe, and visited the Great Hanshin-Awaji Earthquake Disaster monuments in Hyogo Prefecture. He said that his time as an ADRC intern gave him an opportunity to increase his knowledge about disaster risk reduction, and when returning to the Philippines, he will strive to professionally contribute to disaster resiliency.



Figure 4.11 Mr Jhumar Sioson
(Intern)

4.3.2 KOBE Global Challenge

In partnership with Kobe University's KOBE Global Challenge Program (KGCP), ADRC conducted a training program for 13 KGCP students on Tuesday, 26 July 2022. The KGCP is a program that aims to motivate participating students to learn and recognize the necessity of issue-identification and problem-solving skills, which are essential for people working in global arenas, by building on their own experiences in multicultural environments. By attending lectures and participating in practical exercises on disaster management in Asia,

the students and ADRC researchers had many opportunities to actively exchange ideas and opinions. Mr SASAHARA Akio, Executive Director of ADRC encouraged them to take advantage of this program to become global leaders in their fields.



Figure 4.12 Kobe University students at ADRC during the KOBE Global Challenge Program

4.3.3 Try-Yaru

ADRC accepted two seventh-grade students from Kobe Municipal Harada Junior High School as a part of the "Try-Yaru Week" in November 2022, which is a work experience program for junior high school students. During this period, the students learned about the concept of disaster risk reduction through simple activities (e.g., constructing model of earthquake-resistant building out of milk cartons). The students also took part in an online "Town Watching" of the Aotani district of Nada Ward, Kobe City. "Town-Watching" is a planning approach, where community members and stakeholder look around their local areas to observe and gather information to address disaster risks. They also visited the Hyogo Prefectural Wide-Area Disaster Prevention Center.



Figure 4.13 Seventh-grade students at their Try-Yaru program at ADRC

5. Cooperation and Partnerships

5. Cooperation and Partnerships

ADRC forges cooperation and partnerships among member countries and partner organizations to advance disaster resilience. In particular, ADRC engages in research cooperation (e.g., feasibility study on application of new technology) and partnerships with international institutions in organizing learning events.

5.1 Research Cooperation

In FY2022, much progress was made in the research projects pertaining to QZSS, Climate Change Impact Projection Study (SENTAN4), and Economic Research Institute for ASEAN and East Asia (ERIA).

5.1.1 QZSS DC Report Demonstrations

ADRC is member of Japan Project Team that promotes the Satellite Report for Disaster and Crisis Management (DC Report), which is an early warning service (EWS) of the QZSS. With this service, DRM agencies can transmit warning message via satellites. When the message is received on the earth's surface it can be sent over to mobile phones, street lights, car navigation systems, and other terminals allowing emergency evacuation or self-help during disasters. In FY2021, the project team showed notable progress in promoting the QZSS DC Report service. In terms of creating and sending warning message using the MT44 format, the team reported the availability of free software from the QGIS (i.e., QGIS plugin). This allows staffers of disaster management offices (DMOs) to easily create the warning message. In terms of performance of the QZSS device, it was found that it worked very well in receiving the message from satellite, even if it is outside the cellular network area. Considering these achievements, the project will continue the feasibility studies and demonstrations before the actual operations of the DC Report service in target countries beginning 2024.

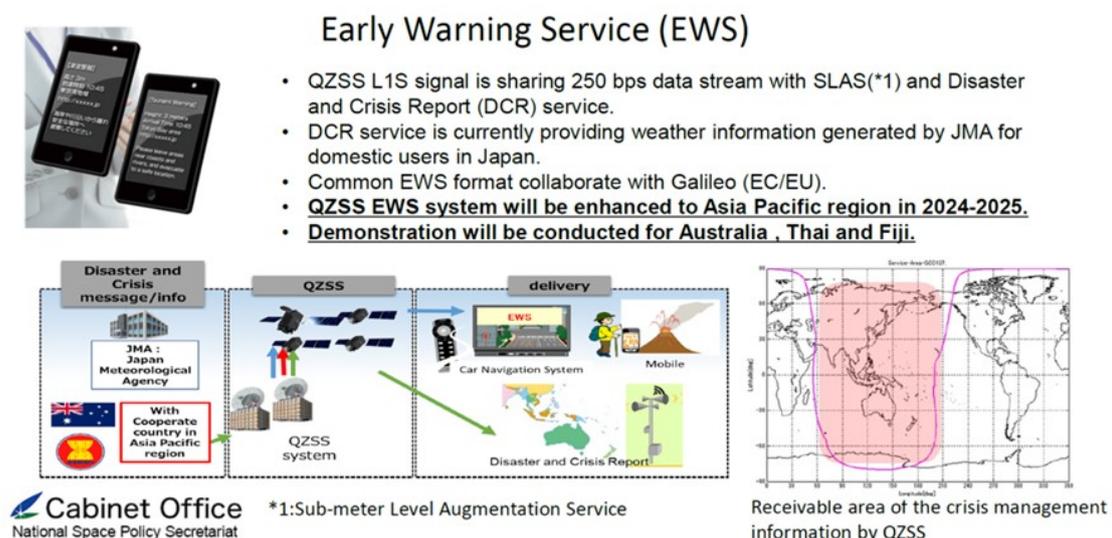
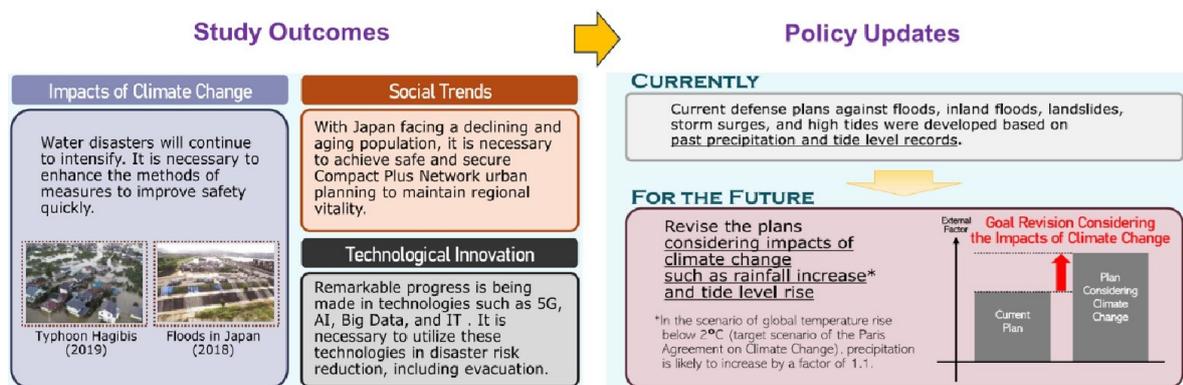


Figure 5.1 Outline of the Concept of QZSS DC Report

5.1.2 Climate Change Impact Projection Study

ADRC, together with over 120 researchers and 43 cooperating organizations, is engaged in the SENTAN 4 Project, "Development of Hazard Integrated Prediction Model" (i.e., multi-hazard model for storm and flood, <http://www.climate.dpri.kyoto-u.ac.jp/sentan4/?p=224>). Under this project, the researchers aim to assess the

future impacts of climate change, particularly, to water-related disasters (e.g., storm and flood), by analyzing historical and current data as well as through climate downscaling techniques and applications. Additionally, social trends and technological innovation information are also analyzed to update policy. ADRC shares the products/outcomes of the study to improve climate change literacy among DRR practitioners, researchers, and engineers as well as inform policy updates.



<https://www.mlit.go.jp/river/kokusai/pdf/pdf21.pdf>

Figure 5.2 Example of using the outcomes of the climate change impact project study to inform policy

5.1.3 ERIA Research Project

Under the ERIA, ADRC works on two research projects: 1) Disaster Mitigation Policies and Methods for Sustainable Economic Development; and 2) Verification of Economic Rationality of Disaster Risk Reduction Investment. During the “Workshop for Climate Change Vulnerabilities, Social Impacts, and Education for Autonomous Adaptation” that was held in Siem Reap, Cambodia on 12–14 September 2022, ADRC presented examples of countermeasures against floods and landslides in Japan.

5.2 International Engagements and Partnerships

In FY2022, ADRC co-organized and/or engaged in many events, including those with APEC-EPWG, Sentinel Asia, UNDRR, ESCAP/WMO, ASEAN, and other networks and partnerships.

5.2.1 APEC-EPWG

ADRC continues to serve as co-chair of the Asia Pacific Economic Cooperation - Emergency Preparedness Working Group (APEC-EPWG), and in FY2022, organized and participated in the following activities:

- 18th APEC Emergency Preparedness Working Group (EPWG) Meeting, 18 August 2022

Mr SUZUKI Koji, who serves as current co-chair of the APEC-EPWG, participated in-person in Chiangmai, Thailand while Mr SASAHARA Akio, Dr SHIOMI Yumi, and Dr Gerald Potutan participated online. The government of Thailand hosted the meeting with the theme, “Promoting Disaster Risk Reduction and Strengthening Partnership Toward Resilient Recovery After COVID-19.” ADRC gave two presentations. The first presentation showed the application of the GLIDE numbering system and the utilization of satellite images in documenting recent disasters (2021–2022) in Asia and the Pacific region. The second presentation showed the potential contribution of Japan’s early warning service (EWS) using the QZSS to support

evacuation and response activities. As indicated in both presentations, ADRC has been implementing DRR projects in the Asia-Pacific region and would like to further leverage greater partnerships in the EPWG to strengthen regional efforts.

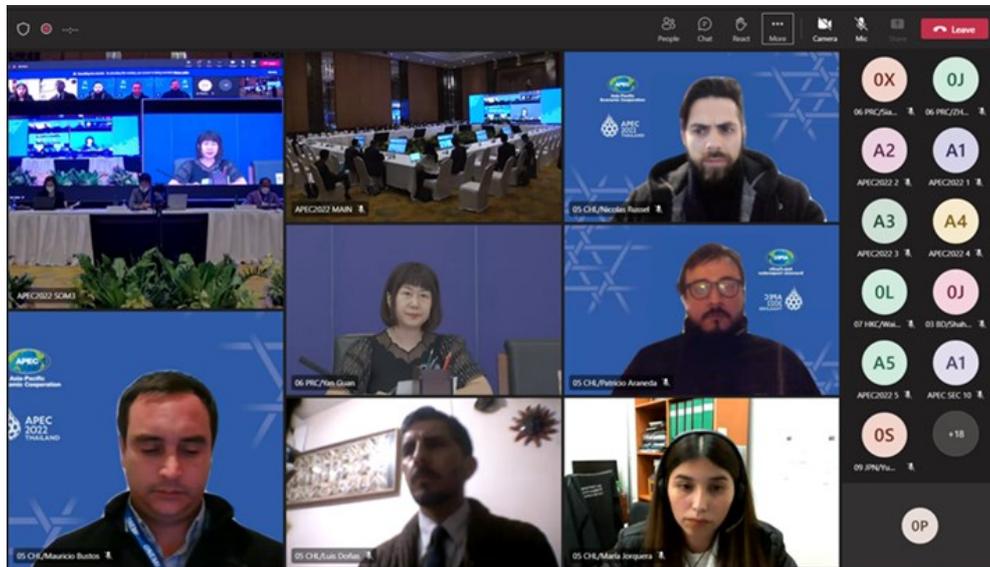


Figure 5.3 Screenshot of the 18th EPWG Meeting

- 15th Senior Disaster Management Officials Forum (SDMOF15), 19 August 2022

During this meeting, ADRC expressed support for updating the 2015 APEC Disaster Risk Reduction Framework and its corresponding DRR Action Plan to make these documents more responsive to post-pandemic recovery efforts in the region as well as to align them with the Putrajaya Vision 2040 and its corresponding Aotearoa Plan of Action. The Framework, and its corresponding DRR Action Plan, recognizes that addressing the impacts of disasters requires holistic, more proactive, multi-stakeholder, multi-sectoral, and strategic interventions to make our economies more resilient. After seven years of implementation, the economies of Chinese Taipei, the Philippines, and Chile expressed the need to review and update the documents.

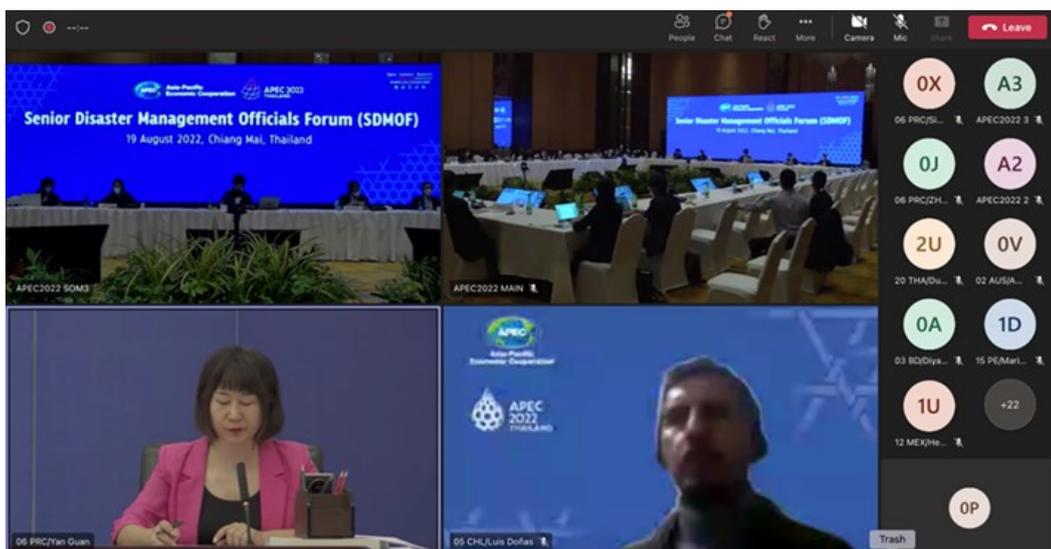


Figure 5.4 Screenshot of the 15th SDMOF Meeting

- Workshop on Strengthening Fire Prevention Capacities in Wildland Urban Interface, 28 Nov–1 Dec 2022 (Online)

In this workshop, Dr Gerald Potutan gave a presentation that highlighted the contribution of climate change impact projection to inform plans, strategies, or policies on climate change adaptation. While climate change does not directly cause a wildfire, it greatly contributes in creating the conditions for wildfire to easily spark and spread with extremely devastating impacts. One of the projected climate change scenarios is that if human activities continue emitting greenhouse gases (GHGs), such as carbon and methane, the global temperature becomes much warmer. This creates the condition for “tinderbox effect”, where summer becomes hotter and drier – a situation wherein wildfire can easily start and quickly spread. After the workshop, participants from 21 APEC member economies and government officials from Chile gained insights on applying climate change impact projection to inform the mitigation and adaption strategies for fire prevention in wildland-urban interface.

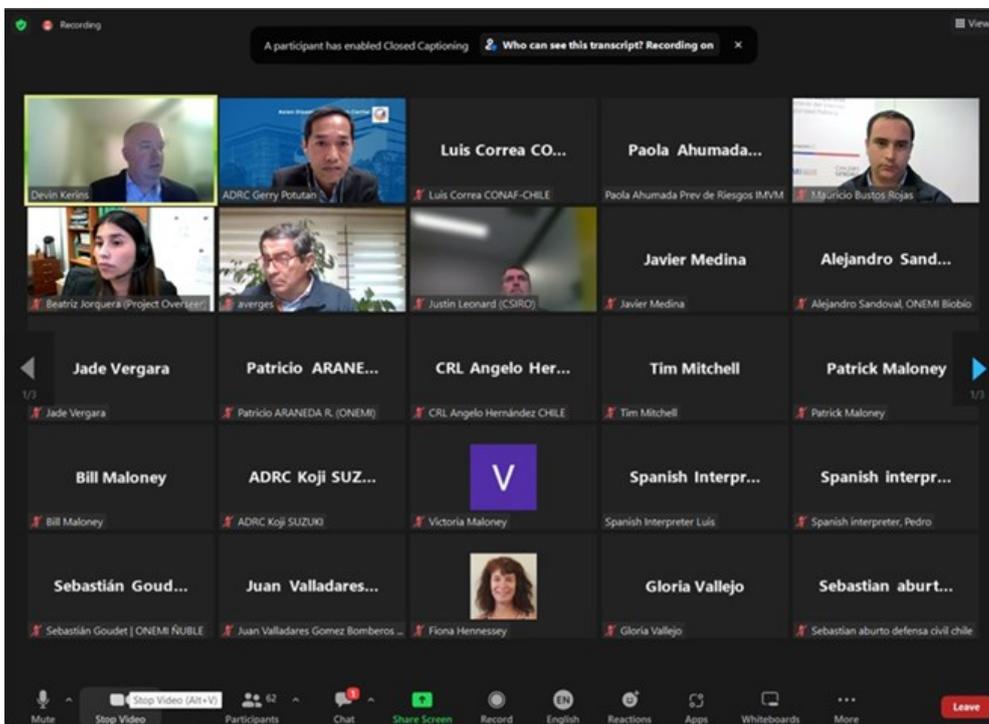


Figure 5.5 Dr Potutan served as speaker at the workshop

5.2.2 APRSAF/Sentinel Asia

Under the framework of the Sentinel Asia – an initiative led by the Asia Pacific Regional Space Agency Forum (APRSAF) to support disaster management with WEB-GIS technology and earth observation satellite data – ADRC functions as the focal point to receive emergency observation requests as well as participate in related activities.

- 28th Session of the Asia-Pacific Regional Space Agency Forum (APRSAF-28), 15–18 November 2022 (Hanoi, Vietnam)

In the APRSAF-28, which was held from 15–18 November 2022 in Hanoi, Vietnam, ADRC participated in the working session of the Space Applications Working Group (SAWG) and gave the first presentation on

Sentinel Asia emergency observation requests (EOR) and future action plans. The Sentinel Asia initiative involves the use of space-based information in the form of satellite images for disaster management. ADRC has been tasked with the responsibility of receiving emergency observation requests from ADRC member countries and Joint Project Team (JPT) members. ADRC gave the second presentation on the activities for "Demonstration Experiment using MICHIBIKI (Quasi-Zenith Satellite System: QZSS)." This activity, which mainly targets the Asia-Pacific region, aims to develop early warnings to encourage residents to take prompt evacuation actions. ADRC will continue to actively participate in activities related to the utilization of space technology in the field of disaster prevention.



Figure 5.6 Dr Ikeda delivered a presentation at APRSAF-28

5.2.3 UNDRR/APP-DRR

- 7th Session of the Global Platform for DRR, 23–28 May 2022 (Bali, Indonesia)

ADRC participated in the following events during the Global Platform: (1) Multi-Hazard Early Warning Conference, 23–24 May, where we learned new developments relating to impact-based forecasting, forecast-based financing, early warning/early action, anticipatory action, and the effectiveness of early warning; (2) World Reconstruction Conference, 23–24 May, which showed pathways to a



Figure 5.7 7th Session of the Global Platform in Bali, Indonesia

greener and more resilient future as well as recovery models for a post-COVID-19 world; and 3) Midterm Reviews of the Sendai Framework Plenaries, 26–27 May, which offered insights on progress made in the fields of financing and governance multi-hazards and the systemic nature of risk, and the operating environment. ADRC also participated in separate meetings with officials from the Asian Development Bank (ADB), ASEAN Secretariat, Department of Disaster Prevention and Mitigation of Thailand, and the Office of Civil Defense of the Philippines, as well as with officials from Fiji and Cambodia. Moreover, ADRC delivered a statement expressing ADRC's commitment to improving regional partnerships to address transboundary risks in the Asia Pacific region. You can read the full statement here: <https://bit.ly/3tHvFuQ>

- Asia Pacific Ministerial Conference on Disaster Risk Reduction (APMCDRR), 19–22 September 2022 (Brisbane, Australia)

In this conference, ADRC organized a partner event entitled, “Building Resilient Communities by Investing in DRR Literacy for Proactive Actions focusing on Leave No One Behind” moderated by Ms KODAMA Miki. The discussions in this event affirmed that: 1) building a culture of DRR and having various people actively participate in DRR activities are effective for increasing DRR literacy; 2) targeting the younger generation in particular will lead to the development of leaders in the next generation; and 3) it is important to sustainably link daily life, welfare, and social



Figure 5.8 ADRC Partner Event at the APMCDRR in Brisbane, Australia

protection during normal times with DRR during emergencies, especially at the local level. It also recognized that institutional and financial support for community disaster management activities is needed to ensure the sustainability of these activities. ADRC displayed two posters: “Quasi Zenith Satellite System (QZSS) for Early Warning Message Platform” and “Applying Space-Based Technology and ICT to Strengthen Disaster Resilience.” Other key sessions that ADRC engaged in included: 1) Risk-Informed Investments and Scaling Up Financing for Disaster Risk Reduction; 2) Governance and Stakeholder Engagement for Resilient Infrastructure Services; and 3) Human Capacity Building that Supports Community Disaster Management by the City of Sendai. Executive Director SASAHARA Akio also issued an official statement introducing ADRC’s efforts for enhancing disaster resilience in the Asia Pacific region.

5.2.4 ESCAP/WMO: Typhoon Committee

Under the auspices of the Cabinet Office Government of Japan, ADRC has been engaged in the activities of the ESCAP/WMO Typhoon Committee. ADRC participated in most of its activities in FY2022.

- Working Group on Disaster Risk Reduction of the Typhoon Committee, 21 October 2022 (online)

In this annual Working Group on Disaster Risk Reduction (WGDRR) meeting, three key items were discussed: the progress of implementing the projects for 2022, proposed projects for 2023, and participation in the Integrated Workshops (IWS). As reported, all seven projects for 2022 were implemented, including the “Knowledge Sharing in DRR” that was held in Guam in the summer. For 2023, WGDRR proposed 7 projects: 1) Capacity Building and Knowledge Sharing in DRR; 2) Setting-up Early Warning and Alert System; 3) WGDRR Annual Meeting; 4) Benefit Evaluation of Typhoon DRR; 5) Sharing Information on DRR; 6) Education Video on DRR; and 7) Seminar for Crowd-Sourcing. At the 17th Integrated Workshops of the Typhoon Committee, WGDRR reported the progress of the projects.

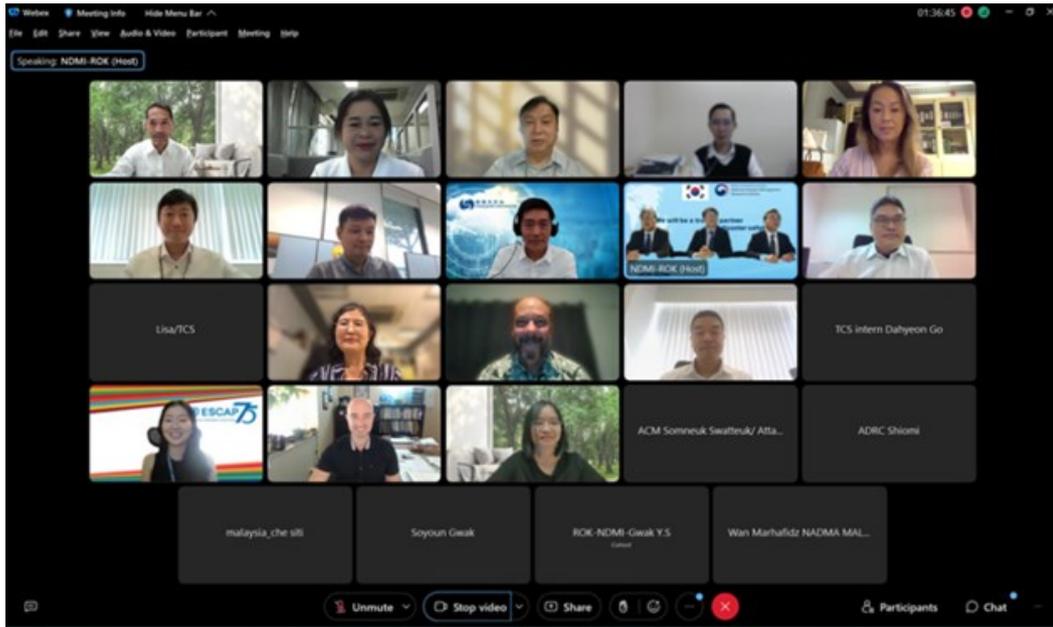


Figure 5.9 Screenshot of the 17th WGDRR Meeting

- 17th Integrated Workshops (IWS) of the Typhoon Committee, 29–30 November 2022 (online)

With the theme, “Tropical cyclone planning, forecasting, and response services for early warning and early action”, the Typhoon Committee Secretariat (TCS) organized the 17th IWS online, on 29–30 November 2022. ADRC participated in this event along with the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) of Japan. One of the keynote presentations was from MLIT, dwelling on, “Use of Satellite Data for Flood Simulation and Risk Evaluation”. The value of satellite data is that it informs the mitigation measures and facilitates early action for flood prevention.

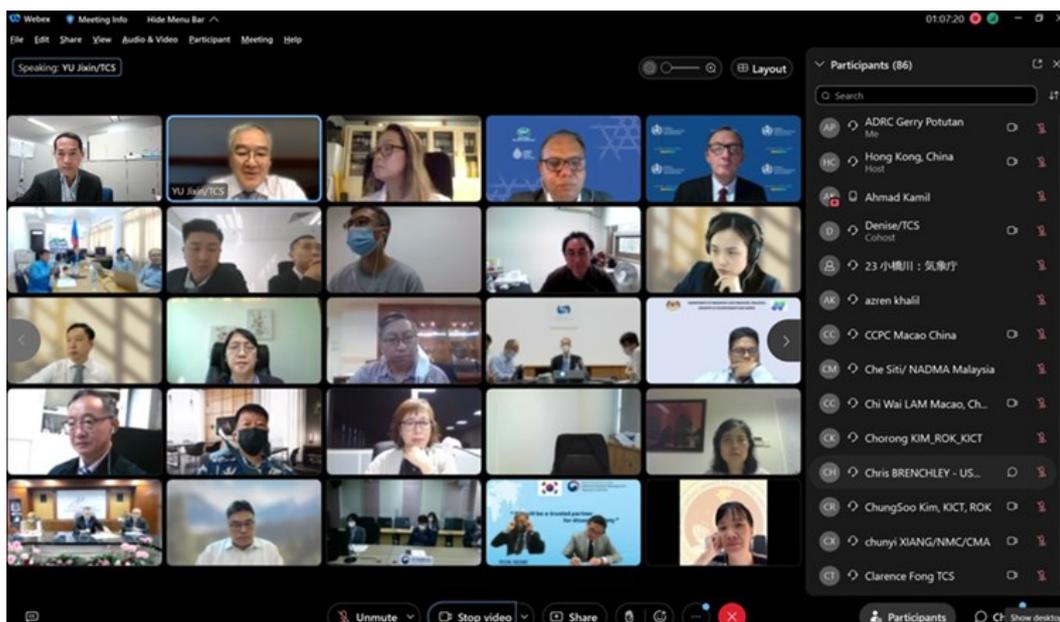


Figure 5.10 Screenshot of the 17th Integrated Workshops (IWS)

• 55th Session of Typhoon Committee, 7–9 March 2023 (online)

As observer, ADRC participated in the 55th Session of the Typhoon Committee (TC-55) which was held online on 7–9 March 2023. The Meteorological and Geophysical Bureau (SMG) of Macao, China hosted this event to: 1) Review the progress of the Typhoon Committee’s programs for 2022; and 2) Plan for activities to be undertaken in 2023 and beyond. The Japan Meteorological Agency (JMA) presented a summary of 2022 typhoon season in Asia and Pacific regions in this session.



Figure 5.11 Screenshot of the 55th Session of the Typhoon Committee

5.2.5 Spatial Planning Platform

ADRC engages with the Spatial Planning Platform (SPP) through co-organizing and participating in the SPP events. SPP is an initiative from HABITAT III that highlights the importance of spatial planning (e.g., urban, rural, and regional planning). In FY2022, ADRC participated online in the 5th SPP.

• 5th Spatial Planning Platform (5th SPP), 2–3 February 2023 (Kathmandu, Nepal)

Addressing the challenges in spatial planning due to increasing natural disasters and climate change was the overarching theme of the 5th Spatial Planning Platform (SPP) meeting held in Kathmandu, Nepal on 2–3 February 2023, which ADRC participated online. The 5th SPP tackled how to formulate and implement spatial plans that ensure prudent use of land and natural resources showcasing examples from Asia. For instance, in the Philippines, the government adopted an overall framework for spatial

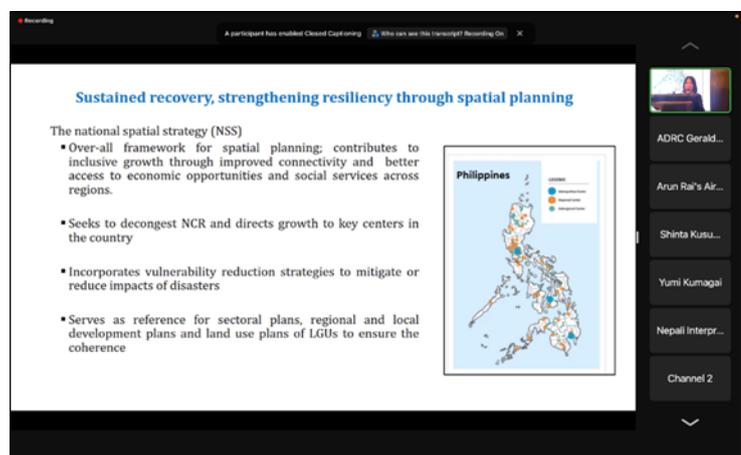


Figure 5.12 Study presentation at the 5th SPP meeting

planning that contributes to: 1) inclusive growth through improved connectivity and better access to economic opportunities and social services across regions; 2) decongestion of the national capital region and directing growth to key centers in the country; 3) incorporation of vulnerability reduction strategies to mitigate or reduce impacts of disasters; and 4) alignment of sectoral plans, regional and local development plans, and local governments' land use plans with the national framework to ensure their coherence. Details of the meeting can be accessed online: <https://www.spp-pr.com/conferences/5thMeeting/>

5.2.6 Other International Engagements

- World Bosai Forum 2023: JICA Session, 10 March 2023 (Sendai, Japan)

ADRC cooperated with JICA in organizing the session “Achievements and Challenges towards the Mid-Term Review of the Implementation of the SFDRR 2015–2030” on 10 March 2023. ADRC member countries took part in a session to discuss how to increase pre-disaster investment to reduce disaster risks and achieve the SFDRR. Officials from respective DRR agencies of Mongolia, Pakistan, and Vietnam shared information on the following: 1) Achievements in Priority 3 of the SFDRR (Pre-disaster Investment), 2) Challenges to achieve the SFDRR, and 3) Future plans to accelerate the implementation of SFDRR as well as promote pre-disaster investment. Disaster management officials from, participants in ACDR2022, were one of speakers and reported on the progress of SFDRR on proactive disaster management investment in their countries.

- The Regional Forum: Meeting of the Heads of National Disaster Management Authorities of Central Asian Countries, 4–6 October 2022 (Dushanbe, Tajikistan)

ADRC participated in the regional Forum co-organized by the Centre for Emergency Situations and Disaster Risk Reduction (CESDRR) and the Committee of Emergency Situations and Civil Defence (CoES) of Tajikistan. In this forum, ADRC introduced current activities that contribute to capacity building in Central Asian countries, such as the visiting researcher program, the Sentinel Asia project, the GLIDE, and the preparations for a future ACDR in Tajikistan. The Regional Forum was attended by more than 70 people including heads of emergency authorities in the Central Asian countries and UN officials, donors, and representatives of international and local NGOs.



Figure 5.13 Group Photo of the Regional Forum in Dushanbe, Tajikistan

- Visit of the Survey Team from Uzbekistan, 21–28 October 2022 (Japan)

ADRC supported the delegation from Uzbekistan, an ADRC member country, by offering advice on the development of their agenda and accompanying the delegation to various sites. Mirzaev Sirojiddin Zaynievich, Vice-President of the Academy of Sciences of Uzbekistan, led the delegation in visiting various Japanese institutions, including Nagoya University and the University of Tokyo as well as government agencies such as the Disaster Management Bureau of the Cabinet Office, the Geographical Survey Institute, the Building

Research Institute, and the National Research Institute of Science and Technology for Disaster Prevention. The delegation was briefed on Japan's legal system and disaster prevention technologies and had opportunities to see actual observation devices and to visit facilities conducting relevant experiments.



Figure 5.14 Survey Team from Uzbekistan during their visit in Japan

- 4th Meeting of the ACDM Working Group on Global Leadership, 7 September 2022

ADRC participated in the Fourth Meeting of the ACDM Working Group on Global Leadership to exchange views and explore future plans to contribute to the “Priority Programme 5: Global Leadership” of the AADMER Work Programme 2021–2025. In this meeting, ADRC proposed to conduct activities that will contribute to the ASEAN-Japan Work Plan on Disaster Management.

6. International Recovery Platform

6. International Recovery Platform

ADRC is among the founding members of the International Recovery Platform (IRP), and continues to support IRP's work, including co-hosting the IRP Secretariat, with the United Nations Office for Disaster Risk Reduction and the Hyogo Prefectural Government.

6.1 International Recovery Forum 2023

IRP held the annual International Recovery Forum on 27 January 2023 in a hybrid format on the theme, "Building Back Better and Long-Term Recovery Outcomes: Aspirations for a Resilient, Sustainable Future". The 2023 IRP Forum welcomed 443 participants hailing from more than 70 countries, both onsite at the Kobe International Conference Center and online.

At the midpoint of the implementation of the Sendai Framework, countries continue to experience significant challenges with building back better, in practice, and achieving improved recovery outcomes. Disaster recovery has been the least researched area in disaster risk reduction, with few long-term longitudinal studies. The factors that drive recovery outcomes in the medium to long-term are not as well-understood as those which drive short term results from recovery projects and programs. Yet, those are the decisive factors that determine whether communities are able to build back more resilient, equitable, and prosperous societies in the decades and generations following a disaster. Recovery is a long, complex, and expensive process involving many stakeholders that can take decades, and long-term considerations can be neglected.

The International Recovery Forum 2023 featured 17 speakers representing 10 countries. Speakers in the opening session included Mr Ronald JACKSON, Chair of the IRP Steering Committee (UNDP), Mr SAITO Motohiko, Governor of Hyogo Prefecture, Mr UEMURA Noboru, Deputy Director for Disaster Management, Cabinet Office, Government of Japan, and Ms Mami MIZUTORI, Special Representative of the United Nations Secretary-General (SRSG) for Disaster Risk Reduction, and Head of the United Nations Office for Disaster Risk Reduction (UNDRR).

The keynote session included two keynote speakers, Mr TAKEMURA

Masayuki, Professor in the Disaster Mitigation Research Center, Nagoya University, and Mr Emil K. SADAIN, Senior Undersecretary, Department of Public Works and Highways, Government of the Philippines.

The first panel session, "Learning from Experience: Long-Run Recovery from Large-Scale Disasters" featured recovery experiences from countries impacted by large-scale disasters over the longer-term. The discussions addressed evidence on effective long term-recovery focusing on challenges, barriers, and gaps as well as enablers and lessons learned from their successes and failures, and how these can inform recovery programs moving forward. Speakers included: Ms Laurie JOHNSON, Principal at Laurie Johnson Consulting and Research and Visiting Scientist at University of California, Berkeley; Ms Lianne DALZIEL, Former Mayor



Figure 6.1 Prof TAKEMURA Masayuki of Nagoya University

of Christchurch, New Zealand; Mr Nadeem AHMED, Former Deputy Chairman of the Earthquake Reconstruction and Rehabilitation Authority (ERRA) and Former Chairman of the National Disaster Management Authority (NDMA) of the Government of Pakistan; and Mr Emil K SADAIN, Senior Undersecretary, Department of Public Works and Highways, Government of the Philippines. The panel was moderated by Mr Ronald JACKSON, Chair of the IRP Steering Committee, and featured Ms Riyanti DJALANTE, Assistant Director and Head of the Disaster Management and Humanitarian Assistance Division of the ASEAN Secretariat, as a discussant in the panel discussion.



Figure 6.2 Panel Discussion 1 of the International Recovery Forum 2023

The second panel session, “Good Practices and Innovations to Ensure Better Long-term Recovery Outcomes” presented several domains of recovery practice, through the perspective of planning for longer term recovery, resilience, and sustainability goals and an analysis of how stakeholders recover. The discussion examined what works for enabling long-term recovery, including financing better recovery outcomes, inclusion and leaving no one behind, institutional considerations and policies, climate change, and other evolving and emerging risks. Panel 2 speakers included Mr Ryan VIADO, Acting Chief, Post-Disaster Evaluation Management Division, Office of Civil Defense (OCD), Government of the Philippines; Mr Kunal SATYARTHI, Joint Secretary, National Disaster Management Authority (NDMA), Government of India; H.E. Mr Diego Alejandro DALTON Rosales, Ambassador of El Salvador to Japan; Mr Luis Alonso AMAYA, General Director, General Directorate of Civil Protection, Government of El Salvador; and Ms Farah KABIR, Country Director, ActionAid Bangladesh. The panel was moderated by Mr Abhilash PANDA, Officer-in-Charge, Intergovernmental Processes, Interagency Cooperation and Partnerships Branch, UNDRR. Ms Laurie JOHNSON from Panel 1 served as a discussant in the panel discussion.

Finally, the speakers at the closing session were Mr Abhilash PANDA and Mr MURAKAMI Takeo, Director of the Cabinet Office of the Government of Japan and Co-Chair of the IRP Steering Committee.

6.2 The Fifth Edition of the World Reconstruction Conference (WRC5)

The fifth edition of the World Reconstruction Conference (WRC5) was organized in a hybrid modality, in Bali, Indonesia on May 23–24 2022, during the preparatory days of the 7th Global Platform for Disaster Risk Reduction. The WRC5 was co-organized by UNDP, GFDRR/World Bank, and UNDRR, which was the first time under the umbrella of their partnership in the International Recovery Platform. Held under the conference

theme, “Reconstructing for a sustainable future: Building resilience through recovery in a COVID-19 Transformed World”, the WRC5 convened 1,600 onsite participants, with more than 3,000 registered online participants in the hybrid event. The WRC5 focused on addressing the unprecedented socio-economic recovery needs as a pathway to rebuild a resilient and sustainable society in the post COVID-19 world. The conference was organized with three sub-themes: 1) Social, infrastructural and economic recovery from disasters as an opportunity to reset the development pathway towards a greener and resilient future; 2) Addressing the social and economic effects and impact of the COVID-19 pandemic on “hard-won” development gains; and 3) Rethinking recovery governance models: Planning, Financing and Managing recovery from complex and interconnected disaster-conflict events in the post COVID-19 world.



Figure 6.3 IRP SC Chair and members at the 5th World Reconstruction Conference (WRC5) in Bali, Indonesia

The IRP Secretariat supported the overall organization and implementation of the conference, including 15 sessions co-organized with the IRP Steering Committee members and WRC5 co-organizers. The IRP Secretariat hosted two technical sessions, “Pre-Disaster Recovery Planning”, and “Responding to Recovery Challenges in the Urban Environment”. The IRP Secretariat hosts the on-demand videos of the World Reconstruction Conference on the IRP’s YouTube channel. The IRP Secretariat also contributed to the production of the final outcome documents, the Joint Communique on Reconstructing for a Resilient Future, and the Fifth World Reconstruction Conference Knowledge Report. Both of the outcome documents are available on the IRP website.

6.3 Contributions to the Mid-Term Review of the Sendai Framework

The International Recovery Platform organized a series of activities that contribute to the Midterm Review process of the Sendai Framework for Disaster Risk Reduction. IRP had organized the IRP Forum 2022 to focus on the key recovery-related questions of the Midterm Review, and to feature national government presentations on their accomplishments and challenges with building back better in post-disaster recovery. IRP later developed a knowledge report for the conference as contributions to the Midterm Review. IRP additionally convened its Steering Committee members for a video project to address the key questions of the Midterm Review for the build back better component of Priority 4 from the perspectives of many of the key agencies working at the international and national levels on supporting disaster recovery. Finally, IRP conducted a systematic desk review of the disaster recovery literature. It reviewed both peer-reviewed literature and gray literature from Preventionweb and Scopus, covering nearly 1200 publications that had been published since the adoption of the Sendai Framework. The systematic desk review integrated the results of the video project, and the IRP Forum knowledge report, and was accepted as IRP's official contribution to the Midterm Review process. The report of the Main Findings and Recommendations of the Midterm Review of the Sendai Framework was published in January 2023, and the full report was published shortly thereafter.

6.4 7th National Convention for the Promotion of Disaster Reduction

IRP participated in the 7th National Convention for the Promotion of Disaster Reduction (BOSAI KOKUTAI 2022). The Bosai Kokutai 2022 was held in Kobe, Hyogo Prefecture, and was organized by the Executive Committee for the National Conference on Disaster Prevention 2022, and led by the Cabinet Office of Japan in cooperation with Hyogo Prefecture, Kobe City, and Great Hanshin-Awaji Earthquake Memorial Human and Disaster Prevention Future Center. This event has been held since 2016 and is now in its seventh year. The purpose of this event is to raise awareness of disaster prevention among the people, particularly at the individual and community levels, and to share knowledge and experiences about disasters in order to enhance disaster preparedness. IRP held an exhibition booth at the conference to introduce its activities to the international community to promote building back better through the introduction of its recovery guidance notes, leaflets outlining its activities, the IRP Herald and knowledge products related to COVID-19, and its contributions to the global agenda on disaster recovery through the Asia Pacific Ministerial Conference on Disaster Risk Reduction, the 6th Session of the Global Platform on Disaster Risk Reduction, and by co-organizing the World Reconstruction Conference 5.

7. Natural Disaster Databook 2022

7. Natural Disaster Databook 2022

ADRC publishes the Natural Disaster Databook annually to provide statistical and analytical perspectives of disaster data. For its 2022 issue, ADRC used the data from the Emergency Event Database (EM-DAT) downloaded on 16 May 2023 to analyze the number of occurrences, deaths, people affected, and economic losses from disaster events – focusing only on eight disaster types: drought, earthquake, extreme temperature, flood, landslide, storm, wildfire, and volcanic activity (Annex 3: Notes on the Sources of Data). The analysis compares the following:

- Comparison of natural disasters in 2022 with natural disasters in the last 30 years (1992–2021)
- Comparison of climate-related disasters in 2022 with climate-related disasters in the last 30 years (1992–2021)
- Comparison of the COVID-19 situations between global level and regional level (highlighting the situations in ADRC member countries)

Here are some of the observations. First, although there was an increasing trend of disaster occurrence globally, a decreasing trend of disaster occurrence was observed in Asian region in 2022. Likewise, the number of deaths, people affected, and the economic losses from natural disasters in Asia in 2022 were lower compared to the annual averages for the past 30 years (1992–2021). Secondly, flood and storm remain to be the frequently occurring disaster types globally and in the Asian region in 2022 and during the past 30 years. Moreover, climate-related disasters, particularly from flood, storm, and drought, account for the highest number of people affected and economic losses in 2022 and during the past 30 years. Thirdly, towards the end of 2022, both the number of confirmed cases and deaths from COVID-19 had declined drastically following a huge surge around the globe and at ADRC member countries. This drastic decline resulted in the lifting of COVID-19 restrictions and opening of borders in over 100 countries in the beginning of 2023.

In 2022, a total of 388 disasters occurred globally. This is higher compared to the annual average for the past 30 years (1992–2021), which is 340. Among the most devastating disasters in 2022 were floods in Pakistan (June to September), droughts in Africa (e.g., Congo, Ethiopia, Nigeria, Sudan, China, Burkina Faso, Malawi, Cameroon, Central African Republic, Chad, Niger, and Mali), typhoons in the Philippines (e.g., Megi in April and Nalgae in October), and hurricanes (e.g., Hurricane Ian in Cuba and Hurricane Fiona in Dominican Republic). While flood was the most frequent disaster in 2022, extreme temperature caused the most deaths (16,416 deaths) accounting to more than half of all disaster-related deaths. However, during the last 30 years (1992 to 2021), earthquakes remained to cause the most deaths from at an average of 990 deaths per disaster event compared to only 52 per disaster event in 2022. The damage caused by disasters in 2022 (USD 223.84 million) is higher than the annual average disaster damage for the past 30 years (annual average of USD 121.46 million).

The situation in Asia is different, where there is a decreasing trend of disaster impacts in 2022 compared to the last 30 years (1992–2021). Occurrence of disasters in 2022 is 137, lower compared to the annual average of 141 for the past 30 years. The number of deaths is also lower in 2022 at 7,750 compared to 30,909 annual average for the past 30 years. Disaster affected people in 2022 is 64.23 million, less than half of the average number of affected persons per year for the past 30 years, which is 168.81 million. The same is true for the

amount of disaster damage. It's USD 48.75 million in 2022, relatively lower than the average annual damage for the past 30 years, which is USD 52.88 million.

Climate-related disasters (e.g., drought, flood, and storm) have been increasing globally, particularly since the 1940s. In 2022, a total of 308 climate-related disasters was recorded worldwide, higher than those from the last 30 years (1992 to 2021) that showed an annual average of 16 droughts, 147 floods, and 100 storms. Except for drought, the number of people affected by 2022 climate-related disasters was less compared to the average number of people affected per year by the same type of disasters during the past 30 years. Meanwhile, the number of people affected by drought is 80 percent more compared to the annual average of the past 30 years. In Asia, a total of 98 climate-related disaster events occurred in 2022, which were mostly floods.

Regarding COVID-19 situation, the highest number of confirmed cases for 2022 was reported on 19 December with a total of 44.20 million confirmed cases reported on a single day. A notable increase was observed in China in December due to an Omicron subvariant with at least eight other Omicron subvariants were identified. Among the ADRC member countries, China showed the greatest cumulative number of confirmed COVID-19 cases at 84.93 million by the end of 2022. This was followed by India with 44.68 million, Japan with 29.11 million, and the Republic of Korea with 29.06 million. Several ADRC member countries started to relax COVID-19 restrictions in 2022, allowing more lenient policies on movement domestically. India, Republic of Korea, and Japan are among the countries that lifted their domestic restrictions. Vaccination also became a priority in ADRC member countries following the relaxation of restrictions with all countries reporting to have had at least two vaccines administered by 2022.

7.1 Natural Disaster Data

Using EM-DAT's 2022 data, this section presents the trends of natural disaster analyzed in terms of occurrence, death tolls, people affected, and economic losses.

7.1.1 Global Disaster Data

As shown in Figure 7.1, there has been an increasing trend of disaster occurrence from 1900 to 2022. From an average of 56 disasters per year in the 1960s (with its peak of 81 in 1966), the average disaster occurrence in the most recent decade (2012–2022) has reached 363 events per year. Furthermore, 388 disasters occurred in 2022, more than thrice the average number of disaster events from 1990 to 2021 (119 disaster events). During the entire period of 1900–2022, flood (39%) and storm (31%) were the most frequent types of disaster.

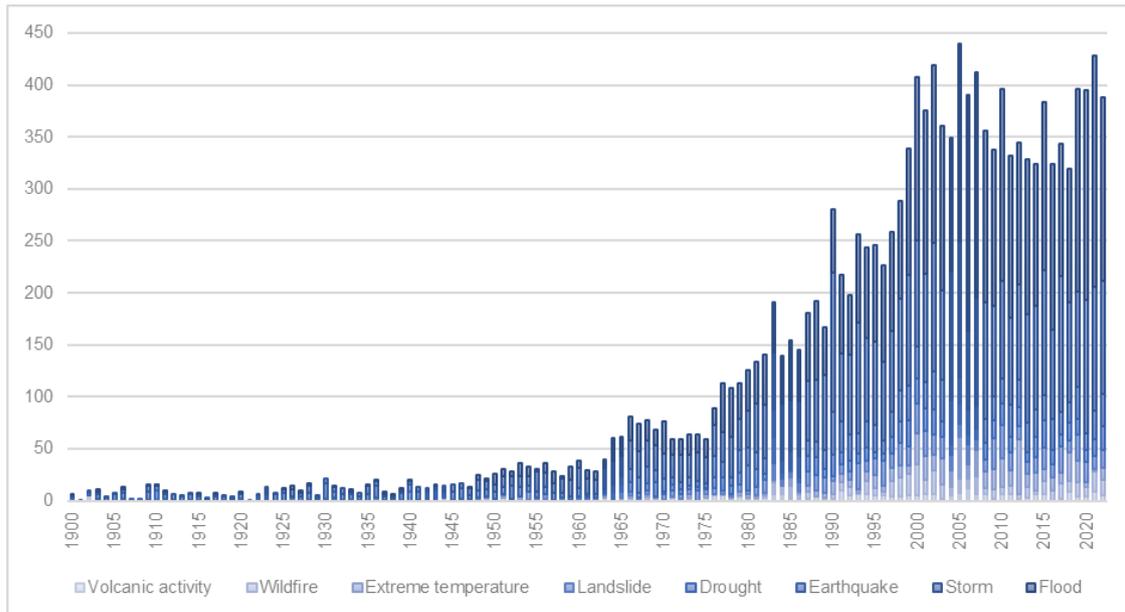


Figure 7.1 Trend of natural disaster occurrence 1900–2022 (EM-DAT/CRED, 2023)

• **Occurrence** (global)

Globally, a total of 388 disasters occurred in 2022. Flood (177 events, 46 percent), storm (105 events, 28 percent), and earthquake (31 events, 8 percent) were the three most frequent disasters (Figure 7.2). Several incidences of drought, landslide, wildfire, and extreme temperature and one volcanic activity were also recorded.

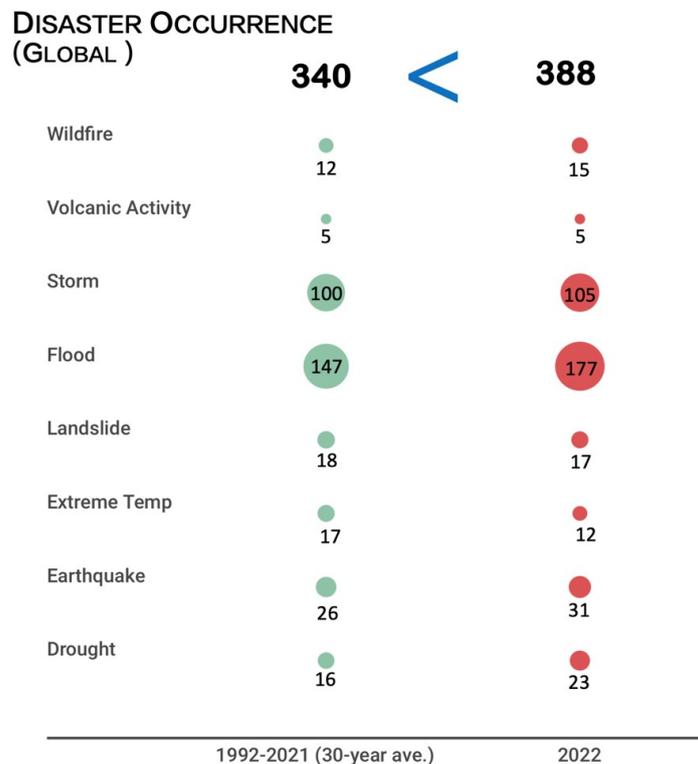


Figure 7.2 Global disaster occurrence by disaster type 1992–2021 vs 2022 (EM-DAT/CRED, 2023)

Among the most devastating disasters in 2022 include the floods in Pakistan (June to September), Bangladesh (May to September), Guatemala (May), Nigeria (July), India (May), Chad (June), and South Sudan (August). There were droughts in Congo, Ethiopia, Nigeria, Sudan, China, Burkina Faso, Malawi, Cameroon, Central African Republic, Chad, Niger, and Mali. In the Philippines, typhoons Megi (local name: Agaton) in April and Nalgae (local name: Paeng) in October made tremendous impacts. In September, Cuba was impacted by hurricane Ian and the Dominican Republic was impacted by hurricane Fiona. Tropical Storm Sitrang impacted Bangladesh in October while Indonesia was impacted by 5.6-magnitude earthquake in November.

Overall, Southeast Asia was struck with the most disasters in 2022 (flood, storm, earthquake, volcanic activity, and landslide) followed by South America (flood, landslide, earthquake, and wildfire), South Asia (flood, storm, earthquake), East Africa (flood, storm, and drought), and Northern America (storm, flood, and wildfire).

The number of disasters in 2022 is higher by 14 percent compared to the annual average for the past 30 years (1992–2021), which is 340. However, it was noted that the number of extreme temperature events was less in 2022. Most of the extreme temperature events in 2022 were due to extreme heat. Only Mongolia had recorded an extreme cold temperature. Moreover, the temperature recorded in countries affected was relatively higher compared to the average extreme temperature recorded for the same country for the past 30 years.

- **Deaths** (global)

In 2022, a total of 30,748 deaths caused by disasters (e.g., extreme temperature, flood, storm, drought, wildfire, landslide, earthquake, extreme temperature, and volcanic activity) was recorded (Figure 7.3). It is fewer than the annual average between 1992 and 2021, which is 49,414. Except for drought, the average number of deaths per disaster in 2022 (79 deaths per disaster event) is also lower than the average from 1992 to 2021 (145 deaths per disaster). While flood was the most frequent disaster in 2022, extreme temperature caused the most deaths. Extreme temperatures caused 16,416 deaths, which accounted for more than half of all disaster-related deaths in 2022. About 99 percent of them were recorded in Europe (Northern, Southern, and Western) while one percent were in Asia (East, South, and West). The recorded death in 2022 for extreme temperature was nearly three times the 6,040 average number of deaths for the past 30 years. Extreme temperature also had the highest number of deaths per disaster event at 1,368 per disaster event in 2022.

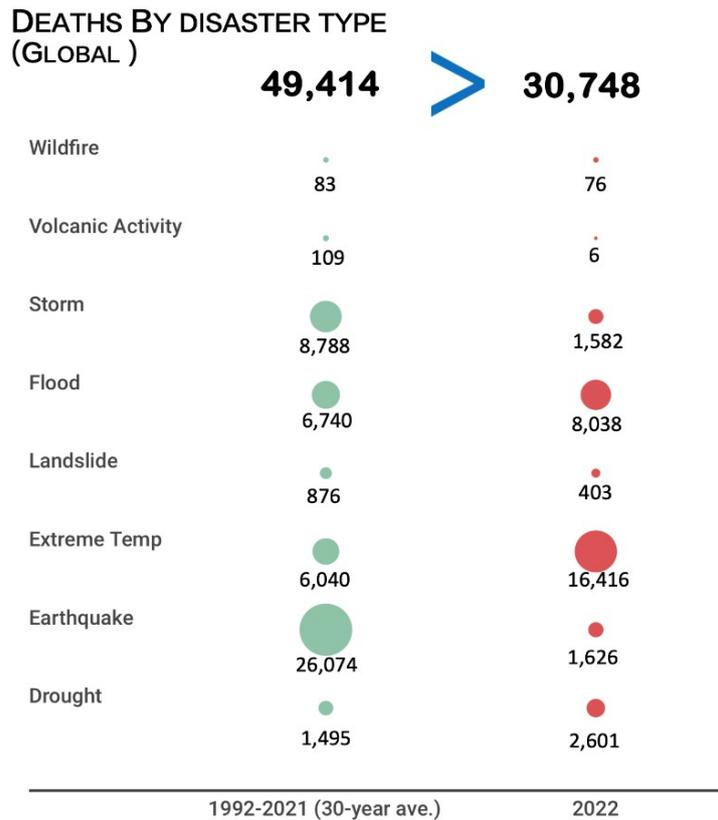


Figure 7.3 Number of people killed by disaster type 1992–2021 vs 2022 (EM-DAT/CRED, 2023)

Other disasters that recorded the most deaths are flood (26 percent), drought (8 percent), earthquake (5 percent), and storm (5 percent). Floods caused 8,038 deaths in 2022, which is higher than the 30-year average of 6,740. This can be attributed to the recent major floods that happened in Pakistan and Bangladesh to name a few.

Due to major earthquake events that happened over the last 30 years (e.g., Haiti, Indonesia, and Japan), earthquakes remained to cause the most mortality from 1992 to 2021 at an average of 990 deaths per disaster event. Comparatively, death per earthquake event for 2022 is significantly lower at 52 per event – the deadliest of these were the 6-magnitude earthquake that hit Afghanistan, the 6-magnitude earthquake in Indonesia, and the 7-magnitude in China. Meanwhile, death per drought incidence in 2022 reached 113, more than twice the average from 1992–2021, which is just 47. It was noted that among the 23 drought incidences in 2022, a total of 2,601 deaths accounted for only two incidences: Uganda and the USA.

Globally, the total number of deaths also showed an increasing trend from 1992–2021. In terms of the total number of deaths per year, earthquake caused the most deaths per year at 26,074. This was followed by storm (8,788 per year), flood (6,740), extreme temperature (6,040), drought (1,495), landslide (876), volcanic activity (109), and wildfire (83).

- **People Affected** (global)

An estimated of 186 million people were affected in 2022. There are 34.56 million affected people in Middle Africa, 32.26 million in West Africa, 30.55 million in East Africa, 13.20 million in North Africa, and 12.72 million in Southeast Asia. More than half of the affected people in 2022 (107.35 million) were affected by drought. Meanwhile, floods affected 57.52 million (31 percent) storms affected 16.93 million (nine percent), while earthquakes affected 3.6 million (2 percent).

**PEOPLE AFFECTED BY DISASTER TYPE (IN MILLION)
(GLOBAL)**

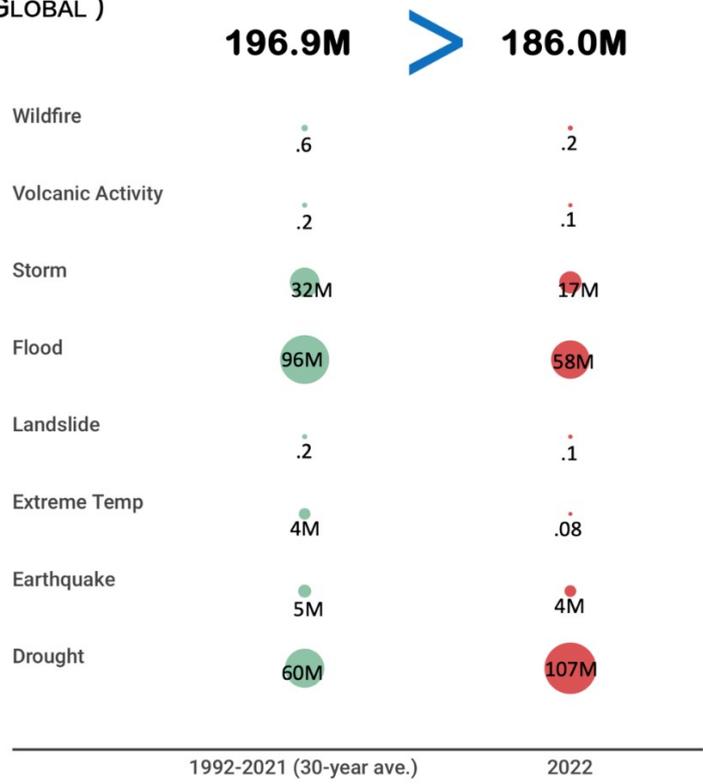


Figure 7.4 Number of people affected by disaster type 1992–2021 vs 2022 (EM-DAT/CRED, 2023)

The total disaster-affected population in 2022 is fewer compared to the annual average of the affected population for the past three decades (1992–2021), which is 196.85 million. However, drought affected more people in 2022 compared with the annual average from 1992–2021. Drought-affected population in 2022 (107.35 million) is 80 percent more compared to the 1992–2021 average (59.61 million). Meanwhile, with reference to 1992–2021 data, Asia has the most affected population, wherein almost 84 percent of the affected population was located. About 10 percent were in Africa while five percent were in America.

South Asia and African regions had the greatest number of people affected by disasters in 2022. Disaster affected population in South Asia reached 44.46 million, 34.55 million in Middle Africa, 32.24 million in West Africa, 30.42 million in East Africa, and 13.20 million in North Africa.

- **Economic Losses** (global)

Based on available data, 2022 disasters caused damage amounting to USD 223.84 billion. About 59 percent of the said amount (USD 130.98 billion) was accounted for damage by storms and 20 percent (USD 44.93

billion) for flood. The EM-DAT data also shows that the damage from 2022 disasters cost more than the annual average damage for the past 30 years, which is USD 121.46 billion. Similarly, storm also caused the most damage from 1992–2021, at approximately USD 53.71 billion or 44 percent of the yearly damage caused by disasters. Flood, earthquake, drought, and extreme temperature also causes millions of dollars’ worth of damage between 1992 and 2021.

**ECONOMIC LOSSES BY DISASTER TYPE (IN BILLION USD)
(GLOBAL)**

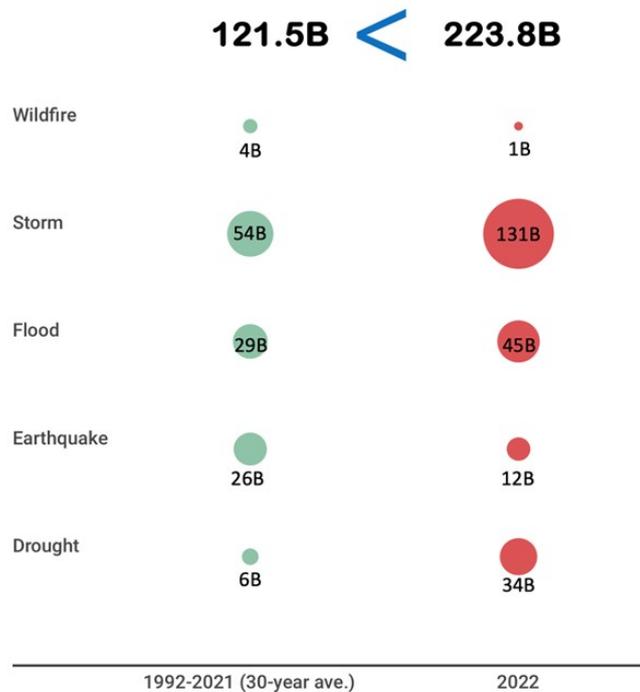


Figure 7.5 Economic losses by disaster type 1992–2021 vs 2022 (EM-DAT/CRED, 2023)

The available data also indicate that for the past 30 years, a huge part of the damage from disasters was concentrated in high-income countries (i.e., USA, Japan, China, Germany, Italy, Australia, etc.). About 97 percent of the recorded annual average damage was accounted for seven high-income countries. Some references pointed out that most of the losses from disasters were higher in high-income countries due to the valuation of infrastructure and houses, higher costs of living, and damage and losses are easily calculated since most of them are insured.¹

7.1.2 Asian Disaster Data

Historically, there were an average of 90 disasters per year in Asia between 1900 and 2021. During this period, China experienced the most disasters. Other countries with the greatest number of disasters include India, Philippines, Indonesia, Bangladesh, Vietnam, Japan, Pakistan, Afghanistan, and Iran.

¹ChristianAid, Counting the Cost 2022: A year of climate breakdown, <https://www.christianaid.org.uk/sites/default/files/2022-12/counting-the-cost-2022.pdf>

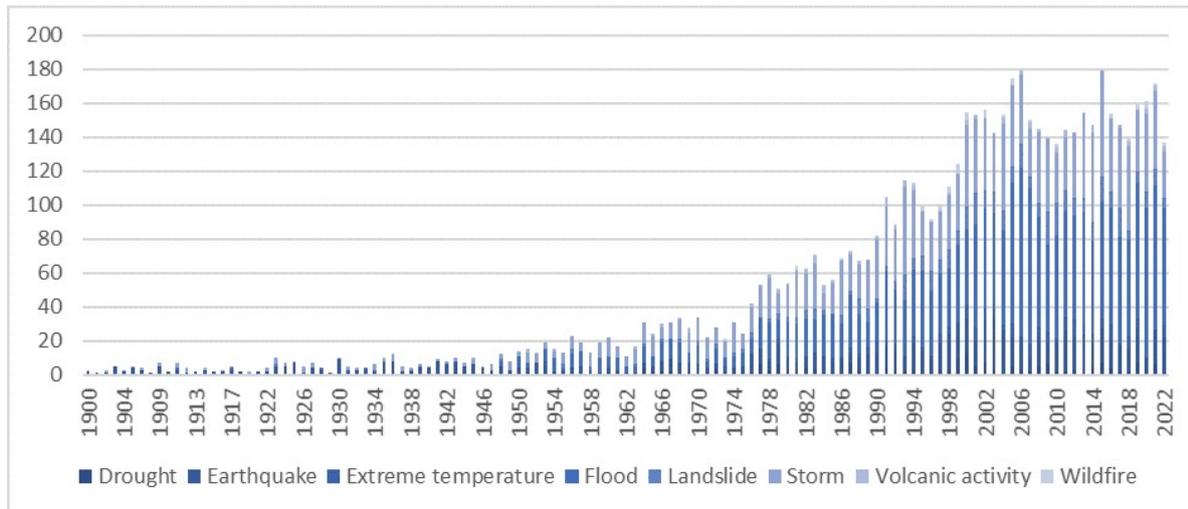


Figure 7.6 Trend of natural disaster occurrence in Asia 1900–2022 (EM-DAT/CRED, 2023)

The top 10 countries with the highest number of disaster occurrences in 2022 include Indonesia (20 events), Philippines (12), China (12), Thailand (11), Viet Nam (8), Afghanistan (8), India (7), Japan (7), Malaysia (6), and Nepal (6).

2022 DISASTER OCCURRENCES TOP 10 COUNTRIES IN ASIA

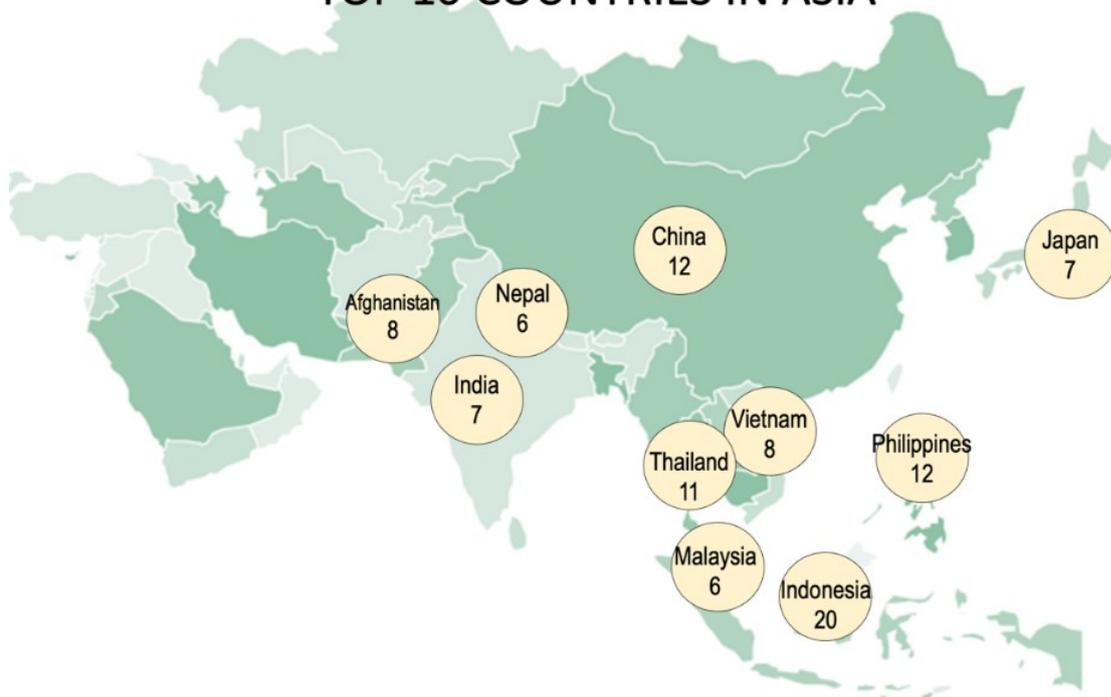


Figure 7.7 Top 10 countries in Asia with high occurrence of disasters in 2022 (EM-DAT/CRED, 2023)

Some of the major disasters that occurred in 2022 include the 5.6-magnitude West Java earthquake in November, the 7.3-magnitude earthquake in West Sumatra in February, and the floods in Pakistan in January and October. Several tropical cyclones and earthquakes also struck the Philippines. Meanwhile, China had a major drought and several instances of earthquakes. Floods and storms also occurred in several areas of Thailand, Vietnam, Afghanistan, Malaysia, India, Japan, and Nepal.

While there were only five disaster events in Pakistan, the three-month flood and flash flood that happened from June to September is considered one of the worst disasters in Asia in 2022. The disaster affected a total of 33 million and caused 1,739 deaths. Similarly, in terms of the number of people affected, the flood in Bangladesh in October also affected about 8.2 million while Typhoon Nalgae affected 7.9 million. China also experienced drought in September which affected 6.1 million. India’s flood in May also affected 1.3 million.

- **Occurrence** (Asia)

A total of 137 disasters occurred in Asia in 2022, which is lower compared to the annual average of 141 between 1992 and 2021 (Figure 7.8). Most types of disasters showed an increasing trend for the past 30 years, except for wildfire which has a decreasing linear trend. Similar to the global trend, flood, storm, and earthquake are the most frequent disasters in Asia from 1992–2021. Disaster occurrence per Asian region in 2022 also followed the trend for the past 30 years. Most of the disasters occurred in Southeast Asia, followed by South, East, West, and Central Asia.

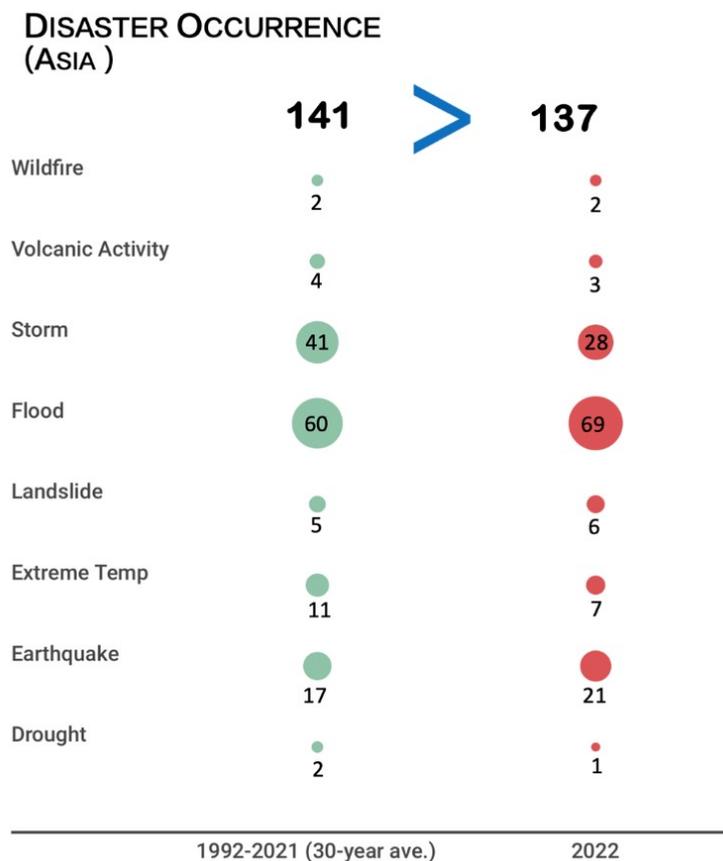


Figure 7.8 Disaster occurrence in Asia by disaster type 1992–2021 vs 2022 (EM-DAT/CRED, 2023)

• **Deaths** (Asia)

A total of 927,278 disaster-related deaths occurred in Asia between 1992 and 2021, with an annual average of 30,909. About 58 percent of these numbers were caused by earthquake. Among other disasters that caused a high number of deaths for the past 30 years are storm (23 percent), flood (14 percent), extreme temperature (2 percent), and landslide (2 percent). Most of the disaster-related deaths in Asia were from Southeast Asia, South, and Eastern Asia, particularly Indonesia, Myanmar, China, India, Pakistan, and Sri Lanka. Comparatively, the 2022 figures were significantly lower at 7,550 deaths.

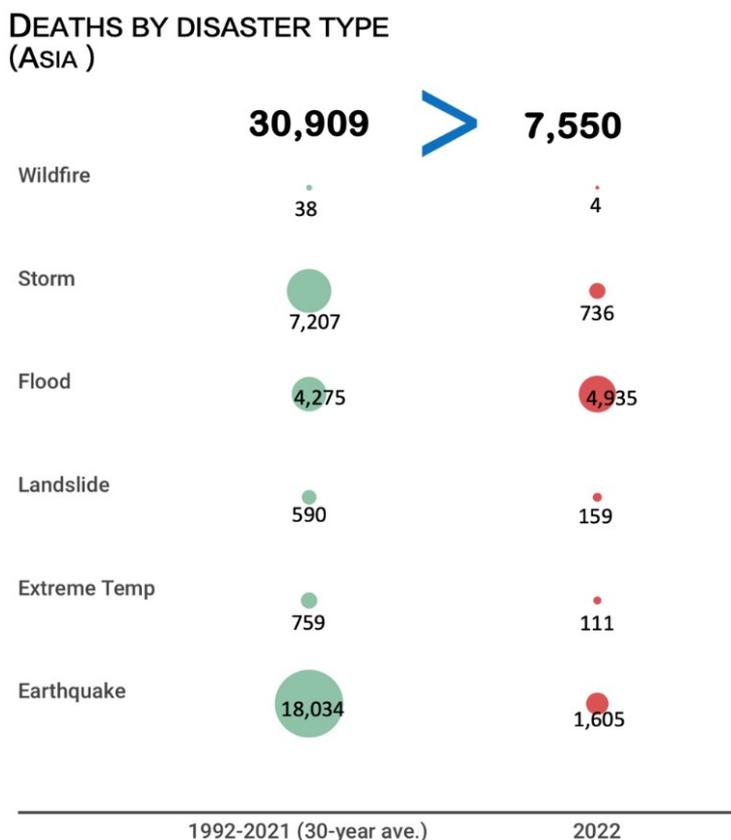


Figure 7.9 Number of people killed by disaster type in Asia 1992–2021 vs 2022 (EM-DAT/CRED, 2023)

The causes of most disaster-related deaths in Asia are different from the global trend. In Asia, disasters that caused most deaths in 2022 include flood, earthquake, storm, landslide, and extreme temperature. Regions that have the most disaster-related deaths in Asia was also slightly different from the 1992–2021 trend. Majority of death due to disasters came from South Asia, accounting for the effect of the massive flood in Pakistan and several disasters in India and Afghanistan. High death incidences were also recorded in Southeast Asia (1,176), particularly Indonesia and Philippines, and East Asia due to several disasters in China.

In terms of death per disaster event, earthquake still has the most both for 2022, which is 76 per event and in the past 30 years, which is 1,055.

• **People Affected (Asia)**

The 137 disasters which occurred in 2022 affected a total of 64.23 million Asians. South Asia has the greatest number of disaster-affected, considering the effects of the disasters in Pakistan, India, and Afghanistan. In terms of disaster types, flood affected the most in Asia in 2022 (45.82 million). Meanwhile, storm, drought, and earthquake also had affected a relatively large number of Asian populations.

Comparatively, the affected population in 2022 is less than half of the average number of affected persons per year for the past 30 years, which is 168.81 million. Meanwhile, East, South, and Southeast Asia had the most affected population during this period. Similarly, flood, drought, storm, earthquake, and extreme temperature also has the most effects in Asia for the past 30 years.

**PEOPLE AFFECTED BY DISASTER TYPE (IN MILLION)
(ASIA)**

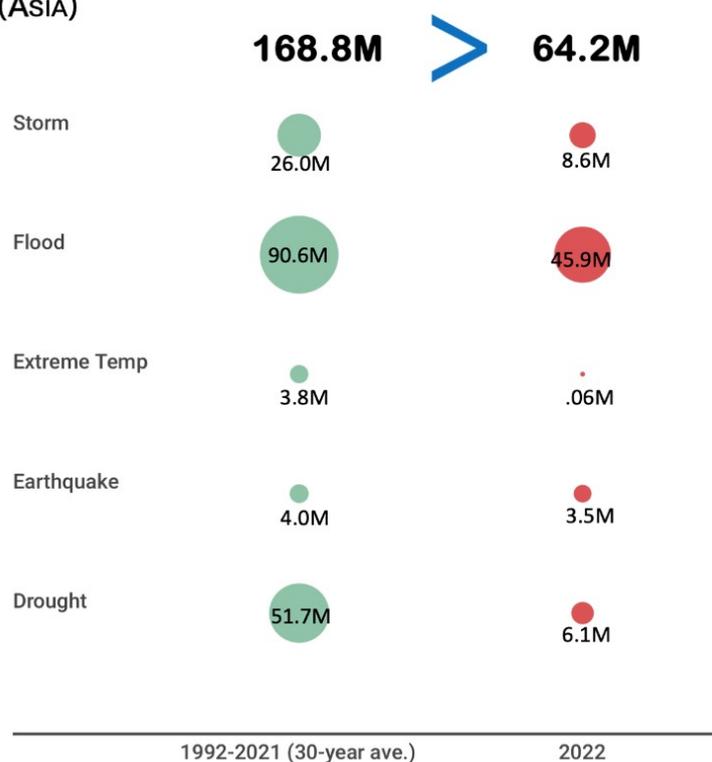


Figure 7.10 Number of people affected by disaster type in Asia 1992–2021 vs 2022 (EM-DAT/CRED, 2023)

• **Economic Losses (Asia)**

Based on EM-DAT data, 2022 disasters in Asia caused about USD 48.75 billion in damages. Flood caused the most damage at USD 25.53 billion, followed by earthquake (USD 12.19 billion), drought (USD 7.6 billion), and storm (USD 3.42 billion). The total amount of damage in Asia in 2022 is relatively lower than the average annual damage for the past 30 years, which is USD 52.88 billion. Similar to the global trend, high-income nations, China and Japan, showed the largest amount of damages incurred for the past 30 years, at 36 and 34 percent of the total damage from 1992 to 2021.

For 2022 on the other hand, due to the extent of damage brought by the flood, Pakistan was second to have the most amount of damages, at USD 15 billion. It was next to China whose disasters in 2022 caused USD 16 billion worth of damage.

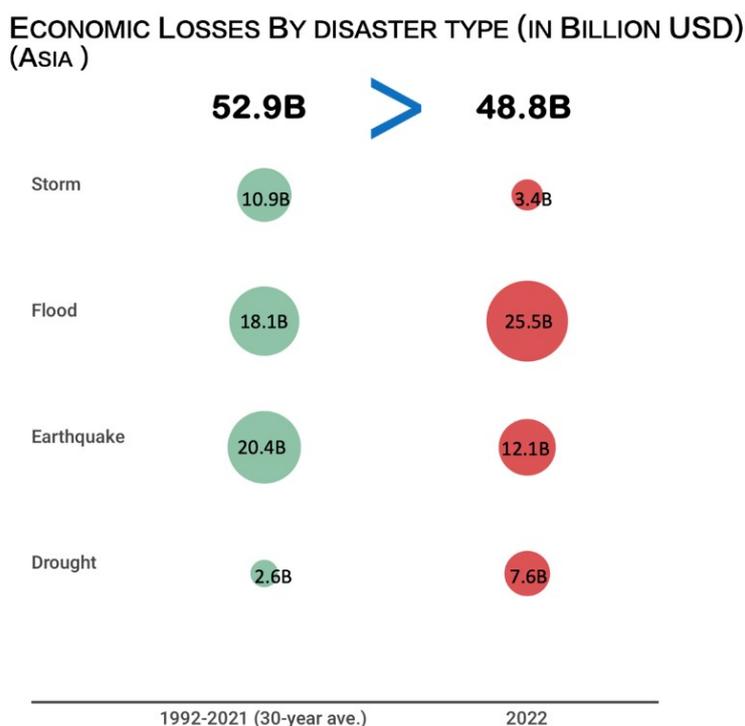


Figure 7.11 Economic losses by disaster type in Asia 1992–2021 vs 2022 (EM-DAT/CRED, 2023)

7.2 Climate Related Disasters

This section provides an overview of climate-related disasters, particularly those triggered by drought, extreme temperatures, storms, floods, and wildfire events.

In the Sixth Assessment Report (AR6) of the IPCC, extremes (e.g., temperature extremes, heavy precipitation, pluvial floods, river floods, droughts, and storms) are highlighted as main Climatic Impact Drivers (CIDs) that affect an element of society or ecosystems². Global greenhouse gas emissions have continued to increase, rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred. These climatic changes are exacerbated by unsustainable energy use, land-use change, lifestyles, and patterns of consumption/production across regions, between countries, and among individuals contributing to climate extremes. Since extremes led to widespread adverse impacts and related losses/damages to nature and people, it helps to know the trend of climate-related disasters.

7.2.1 Global trend in climate-related disasters

Based on the EM-DAT data, climate-related disasters (drought, flood, and storm) have been increasing globally. Floods were the most prevalent among the three with an average occurrence of 93 per year, globally, from 1992 until 2021 (Figure 7.12). There was also an annual average of 70 storms and 13 droughts. From 8 disasters per year in the 1940s, the average number of climate-related disasters per year increased to 290 in the recent decade.

²IPCC, Climate Change 2023 Synthesis Report Summary for Policymakers, https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf

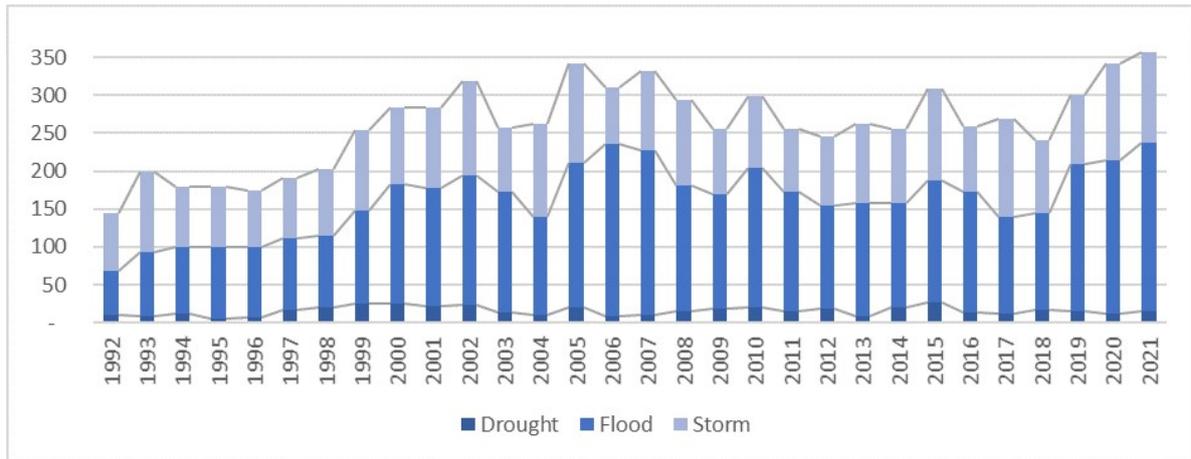


Figure 7.12 Global trend of climate-related disasters (drought, flood, and storm) 1992–2021 (EM-DAT/CRED, 2023)

As shown in earlier figures, climate-related disasters (i.e., drought, flood, and storm) account for the highest number of people affected (see Figure 7.4) and economic losses (see Figure 7.5) in 2022. Of the 388 disaster occurrences recorded globally in 2022, 308 are climate-related disasters. This includes disasters triggered by drought (23 events), floods (177), and storms (108). Based on EM-DAT, 2022 disaster figures were generally higher than those from the last 30 years. From 1992 to 2021, there is an average of 16 droughts, 147 floods, and 100 storms annually. Meanwhile, except for drought, the number of people affected by 2022 climate-related disasters was less compared to the average number of people affected per year by the same type of disasters between 1992 and 2021. The number of people affected by drought is 80 percent more compared to the annual average from 1992–2021 while people affected by floods and storms were less than 40 and 48 percent, respectively.

7.2.2 Asian trend in climate-related disasters

Similar to the global trend, the number of climate-related disasters in Asian countries is also increasing. A total of 98 climate-related disaster events occurred in 25 countries in 2022, almost 32 percent of the total climate-related disaster events globally. This is composed of the massive drought in China, 69 floods, including those in Pakistan and Indonesia, and 28 storms. Relative to past trends, disasters triggered by droughts and storms occurred less in 2022. However, there were more floods in 2022 compared to the average number of floods per year from 1992 to 2021. On average, there were about four droughts, 60 floods, and 41 storms per year in Asia between 1992 and 2021 (Figure 7.13). Yet, fewer were affected by these disasters in 2022 compared to the average number of affected populations per year between 1992 and 2021.

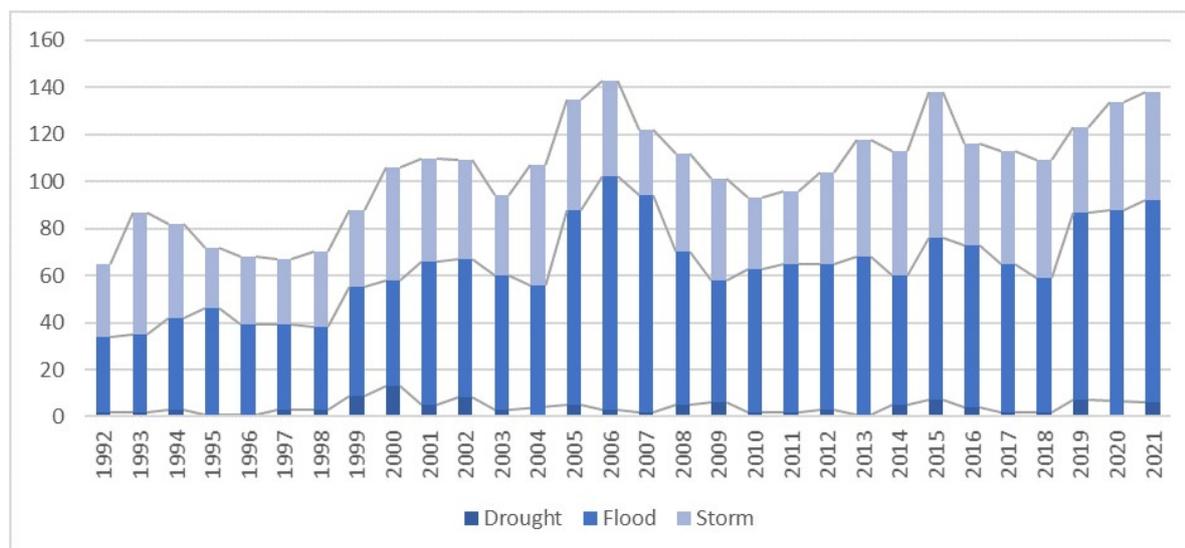


Figure 7.13 Trend of climate-related disasters (drought, flood, and storm) in Asia 1992–2021 (EM-DAT/CRED, 2023)

Based on records, there were also fewer deaths and displaced populations in 2022 compared to the annual average for the past 30 years. Flood remains to be the most devastating disaster as it affected and displaced the most population compared to drought and storms. Meanwhile, storms have the greatest number of average deaths per year compared to floods and droughts. 2022 figures are almost similar to the 30-year trend. Of all the disaster the occurred in Asia in 2022, flood is the most frequent (see Figure 7.8) with the most devastating impacts showing the highest number of people killed (see Figure 7.9), affecting more people (see Figure 7.10), and causing severe economic losses (see Figure 7.11).

7.3 COVID-19 Data

Using data from the World Health Organization (WHO) COVID-19 Dashboard³, this section presents an overview of the cumulative data on the confirmed number of cases and deaths since WHO’s declaration of the pandemic on 11 March 2020. It also shows the situation globally and in ADRC member countries.

7.3.1 Global Situation

While there have been multiple occurrences of upward trends in the number of confirmed cases since the start of the pandemic, the major upward trends in 2022 were recorded in January, March, July, and December. The highest number of confirmed cases for 2022 was reported on 19 December wherein a total of 44.20 million confirmed cases were reported on a single day (Figure 7.14). Ninety percent of the drastic increase in the number was from the Western Pacific region and four percent came from Europe (2 percent) and the Americas (2 percent). A notable increase was also observed in China in December due to an Omicron subvariant. At least eight other Omicron subvariants have been identified in 2022. Omicron subvariants are recognized to be transmitted more rapidly compared to other variants. However, the huge surge of cases in December 2022 was immediately followed by a drastic decline of cases. So, in the first quarter of 2023 many countries started lifting COVID-19 restrictions and slowly opened their borders.

³WHO, COVID-19 Dashboard, <https://covid19.who.int/>

Global Situation

769,806,130

confirmed cases

6,955,497

deaths

Source: World Health Organization
 Data may be incomplete for the current day or week.

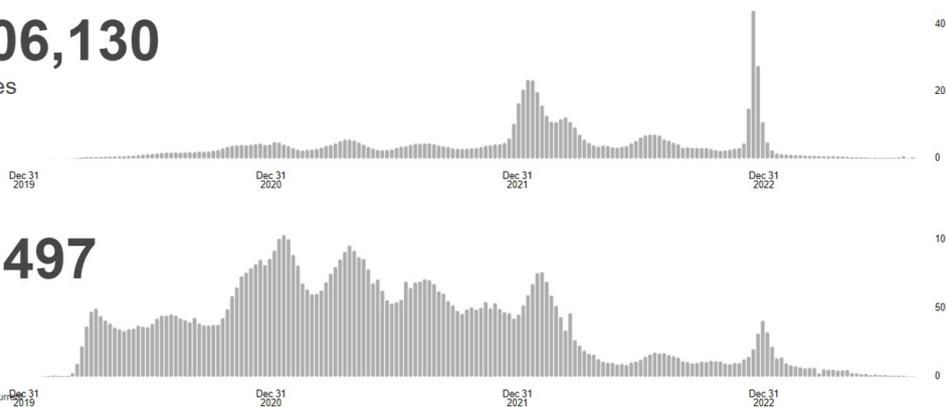


Figure 7.14 Global situation of COVID-19 as of July 2023 (WHO, 2023)

7.3.2 COVID-19 Situation in ADRC Member Countries

By the end of 2022, China has the greatest cumulative number of confirmed COVID-19 cases at 84.93 million. This was followed by India with 44.68 million, Japan with 29.11 million, the Republic of Korea with 29.06 million, and the Russian Federation with 21.80 million (Figure 7.15). Several ADRC member countries have more than doubled the number of confirmed cases from 2021 figures. The highest jump in the number of confirmed cases was from China whose cumulative number of confirmed cases ballooned from 132,071 as of 31 December 2021 to 84.93 million as of 31 December 2022. Other increasing cases included the Republic of Korea (from 635,250 to 29.06 million), Bhutan (2,660 to 62,531), Japan (from 1.73 million to 29.11 million), Singapore (279,405 to 2.21 million), Vietnam (1.73 to 11.53 million), and Thailand (2.22 million to 4.72 million).

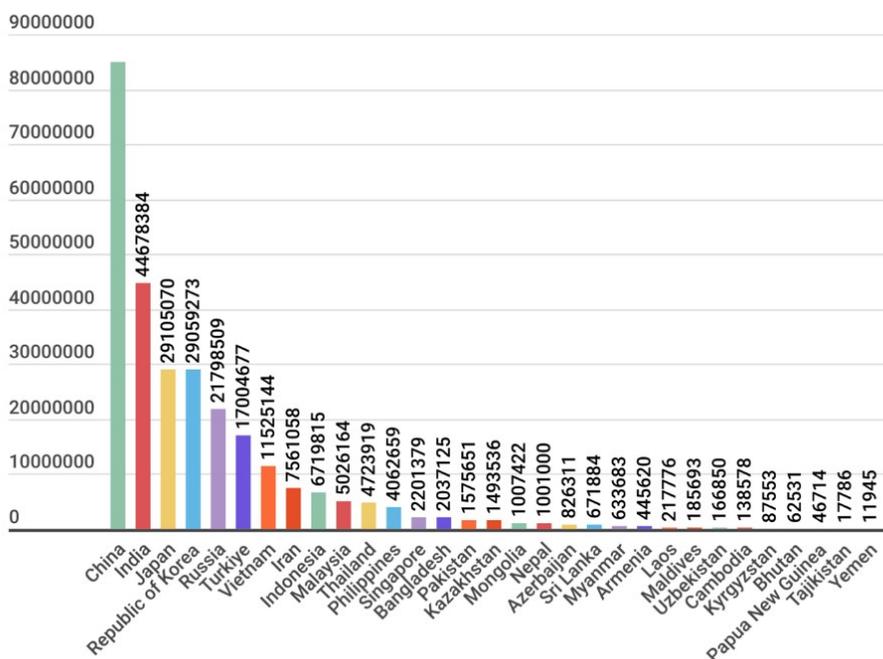


Figure 7.15 COVID-19 cases in ADRC member countries as of 31 December 2022 (WHO, 2023)

Meanwhile, India remained to have the highest number of COVID-related deaths among ADRC member countries at 530,702 as of 31 December 2022. This was followed by the Russian Federation (393,712 deaths), Indonesia (160,612), Iran (144,682), Türkiye (101,419), and Philippines (65,397). In terms of the increased number of deaths from 2021, China also had the largest increase in the cumulative number of deaths due to COVID-19 among ADRC member countries. It increased from 5,699 to 52,544. COVID-related deaths in Bhutan, Republic of Korea, Japan, and Singapore also increased drastically by more than 100 percent. Meanwhile, Myanmar, Cambodia, Nepal, Kazakhstan, and Bangladesh’s number of deaths for 2022 is less than 5 percent of 2021’s. However, it should be noted that the mentioned figures depend on the policies and the number of COVID-19 tests conducted in each country.

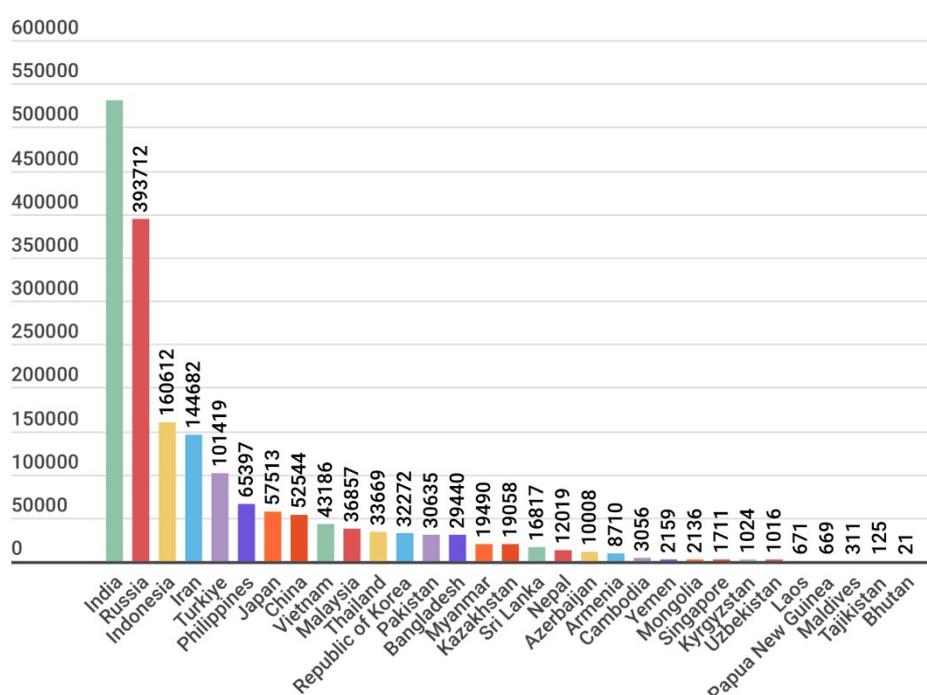


Figure 7.16 ADRC member countries with the highest increase in the number of deaths by 2022

Consider the situation as of December 2022 (Figure 7.18), COVID-19 restrictions have been relaxed in several ADRC member countries, allowing more lenient policies on movement domestically. As early as 2nd quarter, India and South Korea have already lifted some of their domestic restrictions. South Korea also resumed its visa-free travels as early as March 2022.⁴ Japan also removed its cap on foreign travelers and also resumed its visa-free travels during the last quarter of 2022.⁵ Towards mid-2023, almost all countries in Asia opened their borders.

⁴Choi, S (2022, April 15). South Korea to lift most COVID curbs next week as Omicron wanes.

<https://www.reuters.com/world/asia-pacific/skorea-lift-most-covid-curbs-next-week-yonhap-2022-04-14/>

⁵Akiyama, H. (2022, September 14). Japan set to announce restart of visa-free tourist travel. Nikkei Asia.

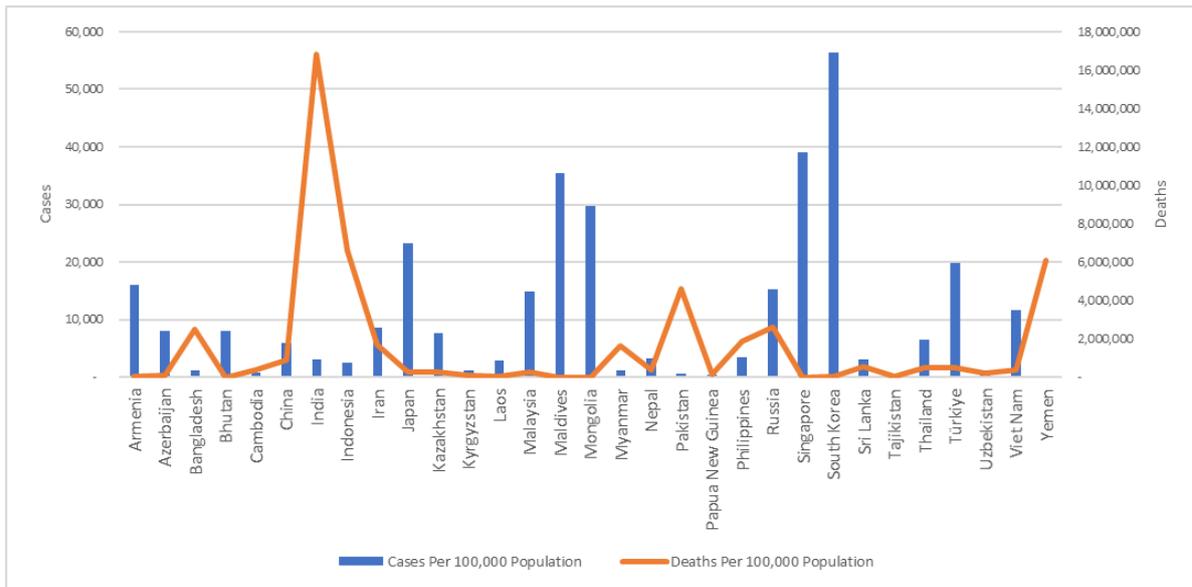


Figure 7.17 COVID-19 Situation in ADRC member countries as of December 2022.

Moreover, with the relaxation of the COVID-19 restrictions, vaccination became a priority in ADRC member countries. All ADRC member countries already had at least two vaccines administered by 2022. However, only three countries provided data on the cumulative number of vaccine doses administered in 2022 – Bhutan, Sri Lanka, and Tajikistan. Based on reported data, there are about 3.85 trillion doses of vaccines administered in four ADRC member countries as of the 1st quarter of 2023 – China, Mongolia, Philippines, and Türkiye.

Annexes

History of Establishment of ADRC

1990s: International Decade for Natural Disaster Reduction (IDNDR)

At its 42nd General Assembly in December 1987, the United Nations (UN) designated the 1990s as the International Decade for Natural Disaster Reduction (IDNDR). It adopted a resolution aiming to sharply reduce the damage caused by natural disasters around the world, particularly in developing countries, through joint international action.

1994: World Conference on Natural Disaster Reduction

In May 1994, the UN held the World Conference on Natural Disaster Reduction in Yokohama, Japan, to conduct an interim review of the decade-long IDNDR initiative and to propose an action plan for the future. At the meeting, the “Yokohama Strategy for a Safer World” was adopted, highlighting the importance of international cooperation in regions that share common types of disasters and disaster reduction measures. Since then, disaster reduction activities have been promoted throughout the world based on this strategy.

1995: Ministerial-level Asian Natural Disaster Reduction Conference

As the first step toward regional cooperation under the Yokohama Strategy, the IDNDR Secretariat organized a meeting in Kobe in December 1995 to formulate a policy on disaster reduction cooperation in Asia. Cabinet members in charge of disaster reduction from 28 countries attended the meeting, which concluded with the adoption of the Kobe Disaster Reduction Declaration. This declaration consists of ideas for promoting international cooperation in disaster reduction, including a Japanese proposal to launch a feasibility study on a system for coordinating disaster reduction efforts in the Asian region.

1996: Asian Natural Disaster Reduction Experts Meeting

The Government of Japan and the IDNDR Secretariat jointly organized an expert meeting in October 1996 to thresh out how a central disaster reduction system, as stated in the Kobe Disaster Reduction Declaration, might be created for the Asian region. The meeting was attended by key personnel in the disaster reduction bureaus of 30 countries, and they agreed to study the creation of the tentatively named “Asian Disaster Reduction Center (ADRC)” to serve as a secretariat for promoting activities under the proposed system.

1997: Asian Disaster Reduction Cooperation Promotion Meeting

Again, the Government of Japan and the IDNDR Secretariat jointly organized a meeting in Tokyo in June 1997 to discuss activities to be undertaken by the proposed center for disaster reduction system. Likewise, the key personnel from the disaster reduction bureaus of 23 countries attended the meeting with an overall

goal of promoting cooperation in disaster reduction efforts through specific actions. A proposal was made at the meeting to establish a center in Japan to serve as the secretariat for the proposed system.

1998: Establishment of ADRC

Gaining momentum from these series of meetings, the Government of Japan discussed the organization, budget, and other aspects of the proposed office with the other countries involved. With the cooperation of Hyogo Prefecture, ADRC was officially established in Kobe on 30 July 1998.

Overview of International Recovery Platform

IRP was established following the Second UN World Conference on Disaster Reduction in Kobe, Hyogo, Japan in 2005 to support the implementation of the Hyogo Framework for Action (HFA) by addressing the gaps and constraints experienced in the context of post-disaster recovery. After a decade of functioning as an international source of knowledge on good recovery practice, IRP refocused its role as an "international mechanism for sharing experience and lessons associated with build-back-better".

IRP is not an operational body. So, it does not directly implement project activities. Instead, it functions as a platform for interested partners to periodically meet to exchange lessons and ideas that will promote recovery best practice and learnings as well as capacity building. Its activities are governed by a Steering Committee and supported by a small Secretariat based in Kobe Japan and hosted by the Japanese Government, the Hyogo Prefectural Government, ADRC, and UNDRR.

IRP works towards supporting greater advancements in the field of resilient recovery and build-back-better by:

- bringing together a broad range of senior policy makers and practitioners to exchange experiences and facilitate discussion on resilient recovery challenges and build-back-better opportunities at the annual International Recovery Forum
- advocating for closer cooperation with development partners, regional intergovernmental organizations, regional organizations, and regional platforms for disaster risk reduction in promoting and building capacity for achieving effective build-back-better outcomes
- sharing of information through its inter-active website

IRP is governed by the Steering Committee, where membership is decided by consensus. Steering Committee members contribute towards the approved activities of IRP, by means of commitment of funds or in-kind contributions. The Steering Committee members can request the Chair for technical experts or specialist to attend meetings on an ad-hoc basis to provide specialist inputs as and when deemed necessary. The members of IRP Steering Committee are: ADB, ADRC, Cabinet Office Japan, CEPREDENAC, Hyogo Prefectural Government Japan, ILO, MOFA-Italy, SDC-Switzerland, the World Bank, UN-Environment, UNCRD, UNDP, UNESCO, UN-Habitat, UNDRR, UNOPS, and WHO (Figure 1 Logos of IRP SC members)



Figure 1. Logos of IRP SC Members

Notes on Sources of Data

Natural Disaster Data

All disaster data are based on EM-DAT: The Emergency Events Database - Université catholique de Louvain (UCL) - CRED, www.emdat.be, Brussels, Belgium. Data set was obtained on 16 May 2023, unless otherwise stated. The presentation of data in Databook 2022 focused only on eight disaster types: drought, earthquake, extreme temperature, flood, landslide, storm, wildfire, and volcanic activity.

EM-DAT Criteria:

For a disaster to be entered into the database, at least one of the following criteria must be fulfilled:

- Ten (10) or more people reported killed
- Hundred (100) or more people reported affected
- Declaration of a state of emergency
- Call for international assistance

Databook 2022 follows the EM-DAT definitions of “people killed” as persons confirmed as dead and persons missing and presumed dead; “people affected” as the sum of injured, homeless, and affected requiring immediate assistance during the period of emergency and requiring basic survival needs such as food, water, shelter, sanitation and immediate medical assistance.

Disaster Terms:

Drought includes an extended period of unusually low precipitation that produces a shortage of water for people, animals and plants.

Earthquake includes ground shaking and tsunamis.

Epidemic includes bacterial and viral infectious diseases.

Extreme Temperature includes heat wave, cold wave, and extreme winter conditions.

Flood includes general flood, and flash flood.

Insect Infection is pervasive influx and development of insects or parasites affecting humans, animals, crops and materials.

Landslide includes avalanche, debris, and rockfall.

Storm includes local storm, tropical cyclone, and winter storm.

Volcanic activity means volcanic eruption.

Wildfire includes bush/brush fire, forest fire, and scrub/grassland fire.

Classification of EM-DAT:

EM-DAT distinguishes between two generic categories for disasters: natural and technological. The natural disaster category is divided into 5 sub-groups, which in turn cover 15 disaster types and more than 30 sub-types. The technological disaster category is divided into 3 sub-groups which in turn cover 15 disaster types:

https://www.irdrinternational.org/knowledge_pool/publications/173

COVID-19 Data

All COVID-19 data used in the Databook 2022 is based from the World Health Organization Coronavirus (COVID-19) Dashboard, <https://covid19.who.int/> accessed on 14 July 2023.

Data from the WHO COVID-19 Dashboard are from the official reporting to WHO through regional offices and also from public websites, not official reported to WHO. Member States select the reporting system they prefer to use and data from different reporting systems. Individual countries, area and territories may decline to allow country-level disaggregation.

Some ADRC member-countries have no record of COVID-19-related data in the WHO COVID-19 Dashboard.