



Economic and Social Council

Distr.: General
16 July 2019

Original: English

Economic and Social Commission for Asia and the Pacific

Committee on Disaster Risk Reduction

Sixth session

Bangkok, 28–30 August 2019

Item 3 of the provisional agenda*

**Regional action: operationalizing
the Asia-Pacific Disaster Resilience Network**

Operationalizing the Asia-Pacific Disaster Resilience Network

Note by the secretariat**

Summary

The Committee on Disaster Risk Reduction at its fifth session in 2017 endorsed efforts to bring together different streams of its work related to multi-hazard early warning systems and regional digital and space applications for disaster risk reduction under an Asia-Pacific Disaster Resilience Network that would serve as the region's knowledge hub. The present document presents an overview of the progress made during the start-up phase (2017–2019) and presents the proposed four work streams of the Asia-Pacific Disaster Resilience Network from 2020 to 2022, namely, multi-hazard early warning system, data and statistics, technology innovation and applications, and knowledge for policy.

The Asia-Pacific Disaster Resilience Network will serve as a network of networks to mobilize the expertise and resources of existing networks and partnerships and deploy them towards developing practical resilience solutions across the Asia-Pacific region's regional landscape, with a focus on the four disaster hotspots identified by the secretariat in the *Asia-Pacific Disaster Report 2019*.

The Committee is invited to provide further guidance on the work streams and examples of outputs proposed.

* ESCAP/CDR/2019/L.1.

** The present document was submitted late owing to staff shortages resulting from the recruitment freeze on temporary positions.

I. Disaster risk hotspots: the context for regional cooperative action

1. The *Asia-Pacific Disaster Report 2019* presents a comprehensive regional “riskscape” that accounts for all types of disaster, including those that are intensive or extensive and those that are slow-onset or rapid. It provides an estimate of the risk of earthquakes, tsunamis, floods, tropical cyclones and storm surges, as well as for the first time that of slow-onset hazards such as drought. These hazards lead to an aggregated average annual loss of approximately \$675 billion, which is four times as much as the estimates provided in previous editions of the *Report*. Drought alone contributes to 60 per cent of the average annual loss, followed by earthquakes, floods and tropical cyclones. It also shows that many more of the region’s disasters are linked to environmental degradation and climate change – leading in the future to a more complex dynamic of unpredictable multi-hazard risks.

2. The *Report* further highlights that many of the disasters are transboundary and clustered in hotspots that have a critical convergence of social vulnerabilities, economic exposure and fragile environments, as highlighted below.

A. Hotspot 1: transboundary river basins

3. In South and South-East Asia, there are transboundary river basin pockets where persistent poverty, hunger and undernourishment coexist with a high risk of floods and droughts. Such disasters have devastating effects on the livelihoods of the poor, as they are primarily involved in agriculture. The Asia-Pacific region accounts for 10 of the 15 countries in the world with the greatest economic and social exposure to annual river floods.¹ In fact, approximately 40 per cent of the world’s poor live in or close to the major transboundary river basins in South Asia. This represents the largest geographic concentration of the world’s poor.²

4. Another widespread disaster hazard in South and South-East Asia is drought. In these subregions, climate change and variability often manifest themselves as monsoon variability, the appearance of El Niño and La Niña, and other extreme weather events. Under the 1.5°C warming scenario, many flood- and drought-prone countries will face a greater risk.

B. Hotspot 2: “Ring of Fire”

5. The Ring of Fire hotspot is an area in which the tectonic activity accounts for approximately 90 per cent of the world’s earthquakes and creates an associated tsunami risk in North-East and South-East Asia. It exposes a large part of the region’s critical infrastructure to vulnerability. It is estimated that 28 per cent of energy power plants, 34 per cent of information and communications technology (ICT) fibre-optic cables, 42 per cent of road infrastructure, 32 per cent of airports and 13 per cent of ports are exposed. In the emergency response phases of a disaster, in particular well-functioning road networks, airports and ports are essential for evacuations and the distribution of

¹ Tianyi Luo and others, “World’s 15 countries with the most people exposed to river floods”, World Resources Institute, 5 March 2015.

² World Bank, *South Asia Water Initiative: Annual Report from the World Bank to Trust Fund Donors – July 2014–June 2015* (Washington, D.C., 2015).

supplies. Energy failure can have a cascading impact on health-care services and ICT, which is a critical infrastructure for timely disaster response.

6. In this hotspot, ICT infrastructure, notably submarine fibre-optic cables in countries such as China, Indonesia, Japan, the Philippines, the Republic of Korea and Singapore, which have high network densities, is particularly exposed.

7. There are also seismic risks that threaten energy resources and transport. Highway nodes and roads across this hotspot are also dense, while many coal, oil and hydropower generation plants – especially in Japan and the Philippines – are exposed to earthquakes and tsunamis.

C. Hotspot 3: Pacific small island developing States

8. Pacific small island developing States are particularly exposed to climate change effects. They lie within cyclone tracks and are also in proximity to the Pacific Ring of Fire. Small island developing States are thus among the most vulnerable countries in the world.

9. Countries such as Palau, Tonga and Vanuatu have disproportionately high proportions of their populations and gross domestic product exposed to disaster risk (see ESCAP/CDR/2019/1). A person living in a Pacific small island developing State is three to five times more at risk than a person in South-East Asia or South Asia.

D. Hotspot 4: sand and dust storm risk corridors

10. In arid and semi-arid regions, there is growing alarm over the increasing frequency and intensity of sand and dust storms. Swirling through risk corridors across East and North-East Asia, South and South-West Asia, and Central Asia, these storms are a consequence of land degradation, desertification, climate change and unsustainable land and water use.³ In South Asia, South-West Asia and Central Asia, the highest dust storm frequencies occur in the Sistan Basin in south-eastern Islamic Republic of Iran and south-western Afghanistan, other areas of south-eastern Islamic Republic of Iran, Balochistan in north-western Pakistan, the Thar Desert of Rajasthan in western India, the plains of Afghan, Turkistan and the Registan area of Uzbekistan. Dust from these areas is transported north to Central Asia, south over the Arabian Sea and east over South-East Asia.⁴ These large-scale sand and dust storms not only disrupt economic flows by damaging multimodal transport infrastructure; they also impact heavily on people's health.

11. Asia and the Pacific has some of the world's most extensive transboundary disaster hotspots. With climate change, these are likely to further intensify.⁵ Owing to the transboundary nature of the hotspots, addressing them will require strategic cooperative plans at the regional and subregional levels to complement national actions.

³ ESCAP, *Sand and Dust Storms in Asia and the Pacific: Opportunities for Regional Cooperation and Action* (ST/ESCAP/2837).

⁴ N. J. Middleton, "A geography of dust storms in South-West Asia", *International Journal of Climatology*, vol. 6, No. 2 (1986).

⁵ *Asia-Pacific Disaster Report 2017: Leave No One Behind - Disaster Resilience for Sustainable Development* (United Nations publication, Sales No. E.17. II.F.16).

II. Asia-Pacific Disaster Resilience Network: start-up phase (2017–2019)

12. The regional road map for implementing the 2030 Agenda for Sustainable Development in Asia and the Pacific⁶ provides the foundation for cooperative regional actions that address gaps in resilience. It identifies disaster risk reduction and resilience as one of the priority areas for regional cooperation to help to advance the implementation of the Sustainable Development Goals in the region. With the aim of translating the road map into an operational structure for disaster risk reduction, the Committee on Disaster Risk Reduction at its fifth session supported the ongoing efforts of the Economic and Social Commission for Asia and the Pacific (ESCAP) to bring together different streams related to multi-hazard early warning systems and applications in space and digital innovations under an Asia-Pacific Disaster Resilience Network that would serve as the region's knowledge hub.⁷ Furthermore, the Asia-Pacific Disaster Resilience Network would serve as the region's knowledge hub and a network to promote greater coherence in the implementation of global development frameworks, including through coordination among members of the Asia-Pacific Regional Coordination Mechanism and its thematic working group on disaster risk reduction and resilience.

13. The actions taken to implement the various components of the Asia-Pacific Disaster Resilience Network in the past two years are summarized in the succeeding sections of the present document. The work of the thematic working group on disaster risk reduction and resilience of the Asia-Pacific Regional Coordination Mechanism during the same period is presented in ESCAP/CDR/2019/INF/1.

A. Deepening and widening the coverage of multi-hazard early warning systems in the region

14. Efforts in the past two years have also focused on mobilizing regional action to deal with natural hazards, which have become even more pressing for many locations across the region.

15. Responding to the observed increase in the frequency of intense tropical cyclones over the Arabian Sea, four new members joined the World Meteorological Organization (WMO)/ESCAP Panel on Tropical Cyclones in 2018. The Islamic Republic of Iran is the newest member from the ESCAP region. Wider regional cooperation to more effectively build preparedness across the Indian Ocean basin is expected from this expansion.

16. The geographic scope of the ESCAP Multi-Donor Trust Fund for Tsunami, Disaster and Climate Preparedness in Indian Ocean and Southeast Asian Countries has been expanded to include Pacific small island developing States, as requested by the Commission in its resolution 71/12. A project funded by the ESCAP Multi-Donor Trust Fund was implemented in the South-West Pacific to support the establishment of national climate outlook forums, building on the successful national monsoon forums in Asia. The project strengthened the framework for tailoring climate information and data for community-level applications in pilot countries, namely, in Fiji, Papua New Guinea and Samoa.

⁶ E/ESCAP/73/31, annex II.

⁷ ESCAP/74/17.

17. Following up on a recommendation made by the Committee on Disaster Risk Reduction at its fourth session in 2015,⁸ ESCAP and WMO are extending their partnership through the WMO Regional Association V Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean. At the seventeenth session of the Tropical Cyclone Committee in 2018, Pacific member States recognized that the partnership between ESCAP and WMO could contribute to enhanced operational capacity in cyclone early warning and preparedness and serve as an important means of sharing experiences from Asia with the Pacific, and vice versa. This subject will be addressed at the next session of the Tropical Cyclone Committee in 2020.

18. The Sulawesi tsunami in 2018 highlighted the urgency of improving the understanding of near-field tsunamis and the operation of early warning systems for this type of tsunami. In recognition of this urgency, the Advisory Board of the ESCAP Multi-Donor Trust Fund acted decisively by approving a project entitled “Strengthening tsunami early warning in the North West Indian Ocean region through regional cooperation” at its nineteenth session in November 2018. Implemented by the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (UNESCO), the project focuses on the Makran subduction zone in the north-eastern Indian Ocean, where a deadly tsunami last occurred more than 70 years ago.⁹

19. Efforts to bring together various institutions to build a regional sand and dust storm alert system have made progress. The joint report of the secretariat and the Asian and Pacific Centre for the Development of Disaster Information Management entitled *Sand and Dust Storms in Asia and the Pacific: Opportunities for Regional Cooperation and Action* presented the case for establishing a system built on the intercountry sharing of data and a common understanding of parametric triggers. Furthermore, ESCAP joined the United Nations Coalition on Combating Sand and Dust Storms and expects that its region-wide work will contribute to a coordinated United Nations approach on the issue, in line with the implementation of Commission resolution 72/7 on regional cooperation to combat sand and dust storms in Asia and the Pacific.

20. Following the widespread and unprecedented flooding experienced by the Islamic Republic of Iran in 2019 and at the request of the Government of the Islamic Republic of Iran, the secretariat and its regional institution, the Asian and Pacific Centre for the Development of Disaster Information Management, was invited to be part of the United Nations team that conducted the post-disaster needs assessment. Led by the United Nations Development Programme (UNDP), the secretariat was requested to lead the macroeconomic impact assessment.

B. Space applications for disaster risk reduction

21. The adoption of the Asia-Pacific Plan of Action on Space Applications for Sustainable Development (2018–2030)¹⁰ by ESCAP member States in 2018 represented a milestone in advancing the use of digitally-enabled geospatial tools for disaster risk reduction and resilience. In the Plan of Action, 50 out of the 188 actions are related to innovations in space applications for disaster risk

⁸ E/ESCAP/72/19.

⁹ ESCAP, “Tsunami early warning systems in the countries of the North West Indian Ocean region with focus on India, Islamic Republic of Iran, Pakistan, and Oman: synthesis report” (April 2017). Available at www.unescap.org/sites/default/files/ESCAP-Synthesis-Report.pdf.

¹⁰ ESCAP/75/10/Add.2.

management, risk reduction, disaster assessment, emergency response, resilient food production and agroecosystem resilience, and climate hazards.

22. The secretariat helped Governments to build their capacities in the use of space technology applications and geospatial data to strengthen multi-hazard early warning systems in the Pacific. The Governments of the Solomon Islands and Tonga put in place a common alert protocol and improved the resolution of their weather predictions with technical support from the Government of Japan, the Asian Institute of Technology and the Indonesian Agency for Meteorology, Climatology and Geophysics.

23. Furthermore, the designation by member States of the ESCAP secretariat as the secretariat of the Regional Committee of United Nations Global Geospatial Information Management for Asia and the Pacific represented an important step towards strengthening the capacity of member States to use geospatial information for multi-hazard early warning and disaster resilience in the implementation of Economic and Social Council resolution 2016/27 on strengthening institutional arrangements on geospatial information management.

24. Through the activities of the Expert Group on Disaster-related Statistics in Asia and the Pacific, the secretariat continued to strengthen links between international agencies to improve disaster-related statistics. In May 2018, the Disaster-related Statistics Framework was finalized with contributions from several international groups and agencies. Expert group members ensured the alignment of the Framework with globally agreed frameworks. In October 2018, the Committee on Statistics endorsed the Framework and supported the recommendations of the Expert Group with regards to applying the Framework and developing training materials and technical assistance programmes to support its implementation. It also supported the recommendation to transform the Expert Group into a technical working group to support the implementation of the Framework by national agencies. These recommendations will be further reviewed by the Committee on Disaster Risk Reduction at its sixth session.

C. Enhancing digital connectivity through the Master Plan for the Asia-Pacific Information Superhighway and the Asia-Pacific Information Superhighway Regional Cooperation Framework Document

25. Building disaster resilience is critically dependent on resilient digital connectivity that is reliable, affordable and available to all, all the time. Nonetheless, secretariat analysis shows that the region is still beset by a digital divide that is continuing to grow. In 14 countries of the region, less than 2 per cent of the population has access to fixed broadband and this situation remains largely unchanged after more than a decade of rapid advances in the rest of the region. The Asia-Pacific Information Superhighway initiative seeks to address this gap. At its seventy-fifth session, through its resolution 75/7, the Commission endorsed the Master Plan for the Asia-Pacific Information Superhighway, 2019–2022 and the Asia-Pacific Information Superhighway Regional Cooperation Framework Document, 2019–2022. It requested the secretariat to continue to support the implementation of the initiative through subregional plans, including through the co-deployment of fibre-optic cables along passive infrastructure as a cost-effective means of bringing broadband to all.

D. Knowledge-sharing for disaster risk reduction and resilience

26. Since the 2030 Agenda for Sustainable Development was adopted by the United Nations, the secretariat has brought its knowledge products on disaster risk reduction in line with the need to support the implementation of the Sustainable Development Goals, including by informing the follow-up and review process.

27. The 2017 edition of the ESCAP flagship publication *Asia-Pacific Disaster Report* examined what “leaving no one behind” – the overarching mandate of the 2030 Agenda – meant for disaster risk reduction efforts. The 2019 edition further develops this analysis by showing solutions that can empower and include those who live in extreme poverty and multi-hazard areas. The *Report* will provide the substantive basis for the discussions at the sixth session of the Committee on Disaster Risk Reduction as well as at a ministerial side event of the 2019 high-level political forum on sustainable development organized by the Government of the Philippines and other member States of the Association of Southeast Asian Nations (ASEAN), in collaboration with the secretariat.

28. Since 2016, the regional learning platform for disaster risk reduction has been organized as an annual capacity-building activity on policy coherence, an important guiding principle of the Sendai Framework for Disaster Risk Reduction 2015–2030 and the Asia Regional Plan for Implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030. The 2018 activity highlighted innovation and evidence-based approaches to policy coherence. A toolkit entitled “Policy coherence for disaster risk reduction and resilience: from evidence to implementation” developed by the secretariat was the main input to the discussions and supports coherence between global development frameworks, most notably between the 2030 Agenda and the Sendai Framework.

29. Against the backdrop of drought in many South-East Asian countries, the secretariats of ESCAP and ASEAN released a study entitled *Ready for the Dry Years: Building Resilience to Drought in South-East Asia* at the thirty-fourth meeting of the ASEAN Committee on Disaster Management in April 2019. The key finding of the study is that with the geography and intensity of drought shifting, timely intervention can mitigate suffering in the face of climate change and prolonged droughts. The study is informing the development of an ASEAN-wide strategy on drought.

30. Through the production of El Niño 2018/2019 impact outlooks, ESCAP, the Regional Integrated Multi-hazard Early Warning System for Africa and Asia and UNDP have demonstrated how to translate a hazard forecast (such as for El Niño) into impact outlooks for various sectors and locations. This has helped inform contingency planning and preparedness. The 2018/2019 editions of the impact outlook were able to robustly incorporate the climate risk exposure of various locations in our region by using the information contained in the forthcoming Asia-Pacific Disaster Risk Atlas, a geospatial database repository on hazards, exposure and risks that was developed under the work programme of the Asian and Pacific Centre for the Development of Disaster Information Management.¹¹

31. A report by the secretariat entitled “Ocean accounting for disaster resilience in the Pacific SIDS: a brief note for policymakers” provided inputs to the Ocean Accounts Partnership for Asia and the Pacific. The report deepens knowledge of oceanogenic disasters in Pacific small island developing States and proposes a methodology for quantifying them with a view to informing policymaking for Sustainable Development Goal 14.

¹¹ ESCAP and Regional Integrated Multi-hazard Early Warning System for Africa and Asia (RIMES), “2018/2019 El Niño Asia-Pacific Impact Outlook for December 2018 to February 2019”, 6 December 2018. Available at www.unescap.org/sites/default/files/ESCAP-RIMES%20EI%20Ni%C3%B1o%20Advisory_6%20December.pdf; and ESCAP, RIMES and UNDP, “2018/19 El Niño Asia-Pacific Impact Outlook for March to April 2019”, 1 March 2019. Available at www.unescap.org/resources/201819-el-ni-o-asia-pacific-impact-outlook-march-april-2019.

32. The past two years have demonstrated that the Asia-Pacific Disaster Resilience Network is a niche service provider and regional knowledge hub. Building on the capacities and partnerships built in the past two years, the next section presents the work streams of the Network, as well as its outputs and partnership network during the period from 2020 to 2022.

III. Asia-Pacific Disaster Resilience Network: operational phase (2020–2022)

33. The objectives of the Asia-Pacific Disaster Resilience Network are threefold: (a) to promote the inclusion and empowerment of at-risk communities in disaster risk hotspots; (b) to capitalize on the existing multi-tier partnership networks to build regional cooperation for slow-onset disasters and floods; and (c) to promote solutions through the uptake of innovative technology applications.

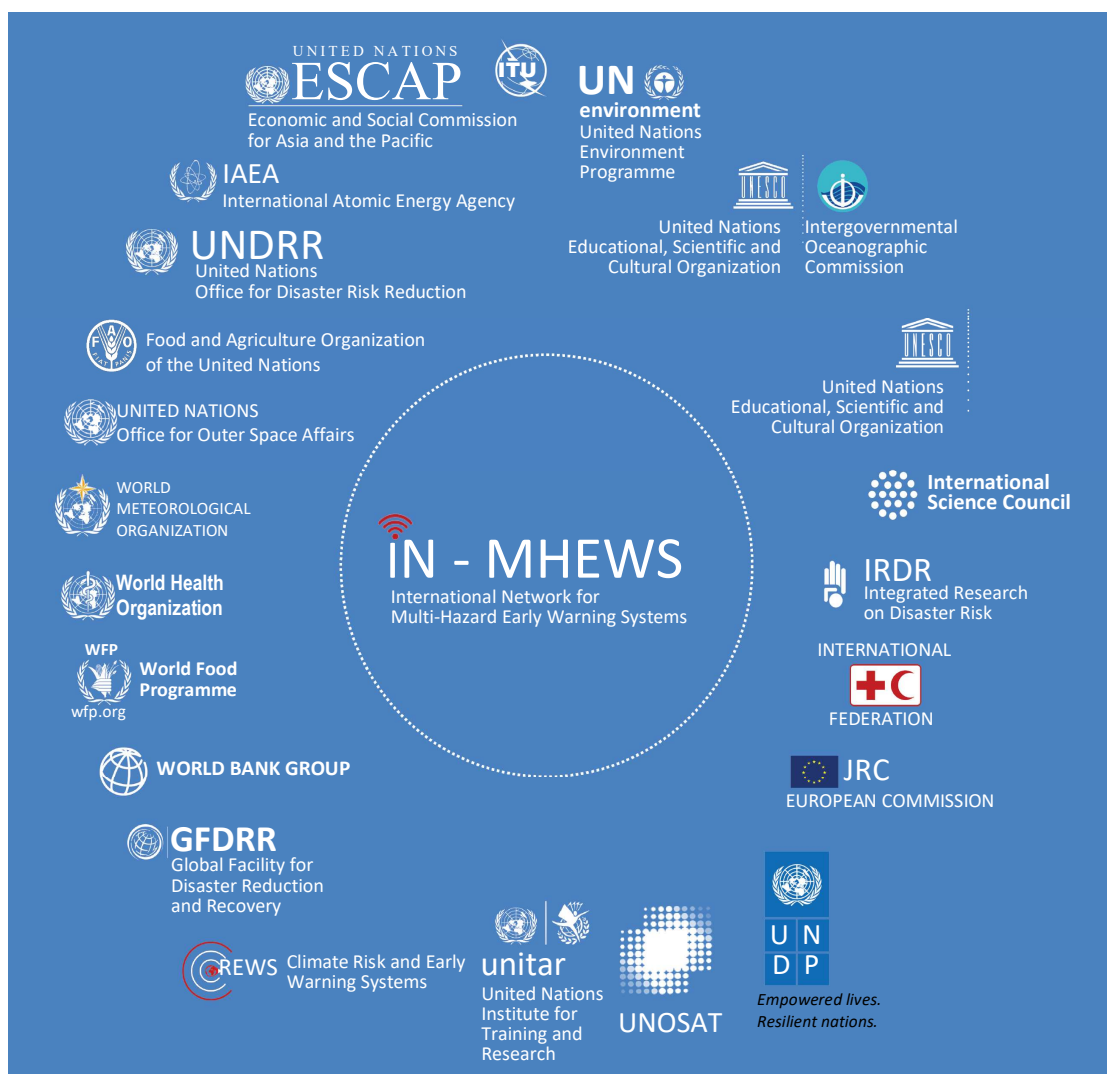
34. The Asia-Pacific Disaster Resilience Network consists of the following work streams: (a) multi-hazard early warning system; (b) data and statistics; (c) technology innovation and applications; and (d) knowledge for policy.

A. Work stream 1: multi-hazard early warning system

1. A network of networks

35. The International Network for Multi-Hazard Early Warning Systems (figure I) is configured to strengthen vertical partnerships – from the country level to the community level and from the regional level to the global level – as well as horizontal partnerships through intercountry cooperation among government agencies responsible for disaster risk reduction. The ESCAP regional platform for multi-hazard early warning systems (figure II) is the regional component of the International Network for Multi-Hazard Early Warning Systems. It supports an effective end-to-end tsunami early warning system in the Indian Ocean and the Pacific basins through the ESCAP and Intergovernmental Oceanographic Commission partnership; the WMO/ESCAP Panel on Tropical Cyclones; and the WMO/ESCAP Typhoon Committee. In this regard, it is noteworthy that for more than a decade, the ESCAP Multi-Donor Trust for Tsunami, Disaster and Climate Preparedness in Indian Ocean and Southeast Asian Countries has been a major contributor to addressing the unmet needs for multi-hazard early warning systems in high-risk countries of the Indian Ocean and South-East Asia.

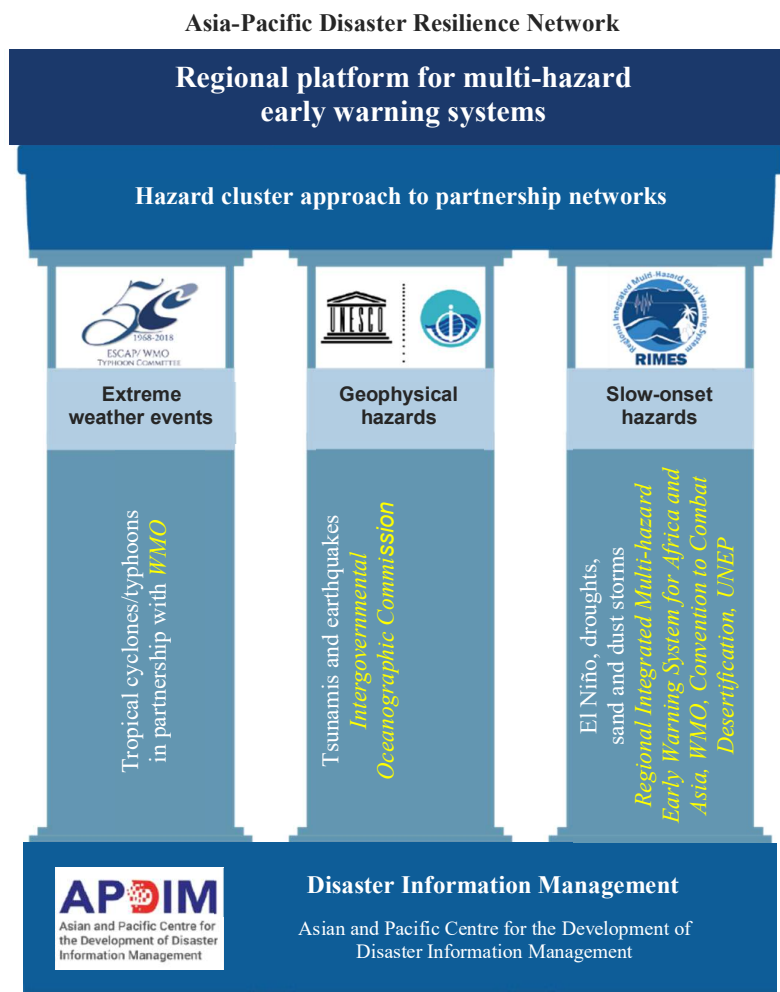
Figure I
Partnership architecture for the International Network for Multi-Hazard
Early Warning Systems



Source: WMO, Second Multi-Hazard Early Warning Conference, May 2019.

Abbreviations: CREWS, Climate Risk and Early Warning Systems; FAO, Food and Agriculture Organization of the United Nations; GFDRR, Global Facility for Disaster Reduction and Recovery; IAEA, International Atomic Energy Agency; IN-MHEWS, International Network for Multi-Hazard Early Warning Systems; IRDR, Integrated Research on Disaster Risk; JRC, Joint Research Centre; UNDP, United Nations Development Programme; UNDRR, United Nations Office for Disaster Risk Reduction; UNITAR, United Nations Institute for Training and Research; UNOSAT, Operational Satellite Applications Programme; WFP, World Food Programme.

Figure II
ESCAP regional platform for multi-hazard early warning systems



Abbreviations: UNEP, United Nations Environment Programme; WMO, World Meteorological Organization.

36. The Asia-Pacific Disaster Resilience Network, through its regional platform for multi-hazard early warning systems, will draw from the expertise of the International Network for Multi-Hazard Early Warning Systems to facilitate the sharing of expertise and good practices and to make its platform a component of national strategies for disaster risk reduction, climate change adaptation and resilience building.

37. The establishment of the Asian and Pacific Centre for the Development of Disaster Information Management in January 2018 reinforced the secretariat's capacity to support countries on common disaster information management challenges with respect to the multiple hazards shown in figure II.

38. In addition to extreme weather events associated with typhoons and tropical cyclones (pillar I), geophysical hazards and related tsunamis (pillar II), the Asia-Pacific Disaster Resilience Network also addresses slow-onset disasters. In this regard, it will leverage the expertise available from the newly established United Nations Coalition on Combating Sand and Dust Storms (pillar III). The Asia-Pacific Disaster Resilience Network thus forms a network

of networks that addresses the unmet needs of multi-hazard early warning systems by capitalizing on advances in technology innovations across Asia and the Pacific.

2. Activities and outputs

39. In line with paragraph 26 (a) of the regional road map for implementing the 2030 Agenda in Asia and the Pacific, the secretariat is advancing regional cooperation to promote effective regional and subregional efforts to strengthen disaster risk modelling, assessment, mapping, monitoring and multi-hazard early warning systems of common and transboundary disasters. The promotion of capacity-building on climate change and climate resilience is also identified as one of the priority areas for regional cooperation in paragraph 28 (b) of the road map.

40. Translating these priority areas of cooperation into the work stream of the Asia-Pacific Disaster Resilience Network, the activities of the Network will be geared towards offering technical support products and services to improve flood forecasting and early warning systems for transboundary river basins and slow-onset disasters.

Technical support service 1: flood forecasting and early warning systems

41. The Asia-Pacific Disaster Resilience Network will bring together the expertise of its networks to improve operational flood forecasting and early warning systems in transboundary river basins, which represent a key hotspot in the region.¹²

42. These technical institutions will work together to build the capacity of countries to use science innovation and techniques that address gaps in access to data and information and increase the lead time and confidence of users in applying flood forecasts in their operations. For example, advances in modern technologies, such as large data and multi-model ensembles, can be used to generate probabilistic forecasts and increase the availability of forecasts and the lead time of information in many places. An ensemble prediction system is particularly useful in transboundary river basins where gaps in data and information flow are prevalent. Customized regional products and services will be developed to enable countries to use products from ensemble prediction systems run by leading prediction centres. These products and services will also enable them to assimilate both weather and climate information to increase the lead time of forecasts that can be made available for operational decisions.

43. Regional products from this work stream will include an update of the ESCAP/Regional Integrated Multi-hazard Early Warning System for Africa and Asia toolkit in the most suitable format (online or as a decision support system) for operational forecasters on flood forecasting and early warning systems in transboundary river basins,¹³ in order to provide the necessary information on how to utilize probabilistic and deterministic modelling frameworks, and how to

¹² Building on the work carried out under the project implemented with funding support from the Government of Germany through the German Agency for International Cooperation.

¹³ ESCAP, “Tsunami early warning systems in the countries of the North West Indian Ocean region with focus on India, Islamic Republic of Iran, Pakistan, and Oman”; and ESCAP and RIMES, “Flood forecasting and early warning in transboundary river basins: a toolkit” (Bangkok, 2016). Available at www.unescap.org/sites/default/files/Flood_toolkit_HighRes.pdf.

integrate meteorological, hydrology and flood forecasting models and access real-time data and information from multiple sources. A counterpart manual for users of flood early warning systems will also be developed to enhance the uptake of such information in risk-sensitive decision-making.

Technical support service 2: slow-onset disasters with a focus on drought and sand and dust storms

44. The *Asia-Pacific Disaster Report 2019*, as summarized in document ESCAP/CDR/2019/1, reveals that slow-onset disasters dominate the risk landscape of the Asia-Pacific region. The Asia-Pacific Disaster Resilience Network will therefore put emphasis on responding to this challenge by bringing partners to work together on regional products and services that will improve early warning systems for slow-onset disasters and the corresponding applications. These partners are currently working as distinct communities and the value added of the Asia-Pacific Disaster Resilience Network would be to bring them together to work on demand-driven products and services that seamlessly combine risk information for all timescales.

45. The secretariat has long supported efforts to improve the capacity of countries in the use of long-range climate information (one to six months) to inform tactical and strategic decisions in climate-sensitive sectors through its support for the national climate outlook forums (also known as “monsoon forums”), which are being convened by national hydrometeorological services. Under the Asia-Pacific Disaster Resilience Network, stronger linkages between the regional and national climate outlook forums could be supported and sustained. The regional climate outlook forums that are being convened regularly in South Asia, South-East Asia and the South Pacific will be supported to enable them to continue providing an important source of technical resources and capacity-building to national hydrometeorological services and forecast user sectors.

46. A refined assessment of risk for the subseasonal timescale (two to four weeks) is important as many of the critical decisions in weather and climate-sensitive sectors, such as agriculture, water, disaster management and health, are made during this timescale. The subseasonal forecasting technique, which is a relatively new scientific breakthrough, will potentially meet the demand for information within this critical timescale. As a regional product under this work stream, the Asia-Pacific Disaster Resilience Network’s work could transform the potential of these forecast products from experimental to operational by organizing pilot projects with national agencies to demonstrate their utility within the broader system of applying weather and climate information for reducing risks in sectors.

47. In its resolution 72/7, the Commission requested ESCAP to accord priority to combating the transboundary challenge of sand and dust storms, through the promotion of regional and interregional networking, including through the Asian and Pacific Centre for the Development of Disaster Information Management, and in partnership with the United Nations Environment Programme, WMO and the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa. The secretariat’s ongoing work, under the Asia-Pacific Disaster Resilience Network and implemented in partnership with the Asian and Pacific Centre for the Development of Disaster Information Management, is focused on: (a) developing parametric triggers observed through Earth observation satellite imagery and the medium- and long-term modelling of patterns for the operationalization of a sand and dust storms alert system; (b) establishing a subregional cooperation mechanism in South-West and

Central Asia consisting of stakeholders and nodal institutions in China, Japan, Mongolia and the Republic of Korea for experience-sharing with North and East Asia; and (c) developing an action plan for slow-onset disasters including sand and dust storms – involving member countries from South-West and Central Asia.

48. Advances in technologies enable more effective multi-hazard early warning systems data, statistics and information. The benefits of new technologies can be transferred from high- to low-capacity countries through regional cooperation. The networks of the Asia-Pacific information superhighway and the ESCAP initiative to enhance the availability, affordability and resilience of regional broadband infrastructure, including in particular its work related to e-resilience, will thus also support this work stream.

49. The outputs of this work stream will be the improvements of institutional and human capacities in developing and least developed countries, small island developing States and landlocked developing countries to generate and apply early warning information for reducing risk. They will be consistent with the efforts made within the WMO Global Framework for Climate Services but the priority will be to focus on the disaster hotspots in the region.

3. Implementing partners

50. The conveners of the regional climate outlook forums – namely the regional climate centres such as the Indian Institute of Tropical Meteorology in South Asia, the ASEAN Specialized Meteorological Centre/Meteorological Service Singapore in South-East Asia and the secretariat of the Pacific Regional Environment Programme in the Pacific – and the institutions that support them, will be the key implementing partners.

51. Pursuing the goal of the Asia-Pacific Disaster Resilience Network to bring various partners under one umbrella, the secretariat will deepen its ongoing engagement with the ASEAN Specialized Meteorological Centre/Meteorological Service Singapore and the Regional Integrated Multi-hazard Early Warning System for Africa and Asia to build capacities to generate subseasonal forecasts (two weeks to one month).

52. Discussions are under way to explore the potential of the Asia-Pacific Disaster Resilience Network to upscale the regional services being developed and rolled out by the Met Office of the United Kingdom of Great Britain and Northern Ireland and the Regional Integrated Multi-hazard Early Warning System for Africa and Asia, in the context of the ongoing Asia Regional Resilience to a Changing Climate programme in South Asia. For sand and dust storms, the key implementing partners are the United Nations Environment Programme, United Nations Convention to Combat Desertification, WMO, UNDP and members of the United Nations Coalition on Combating Sand and Dust Storms.

B. Work stream 2: data and statistics

1. A network of networks

53. Pursuant to Commission resolution 74/6, the secretariat will accord priority to coordination with other national and international institutions, including through the Global Partnership on Disaster-related Statistics, the working group on geospatial information and services for disasters of the Committee of Experts on Global Geospatial Information Management, the Regional Committee of United Nations Global Geospatial Information Management for Asia and the Pacific, and the Asian and Pacific Centre for the

Development of Disaster Information Management, to help to ensure alignment with internationally agreed development goals and to continue to foster cooperation and synergies among relevant initiatives on statistical development and geospatial information management.

2. Activities and outputs

Geospatial information and services for disasters

54. The Asia-Pacific Disaster Resilience Network will promote data acquisition and integration approaches, including Earth observation and geospatial information. In its role as the secretariat of the Regional Committee of United Nations Global Geospatial Information Management for Asia and the Pacific, the ESCAP secretariat has developed, under the guidance of the Committee's Executive Board, a programme of work that contributes to a strengthened capacity of member States in geospatial information management. It is also upgrading the Committee's website so that it can function as an interactive and data-sharing platform. Relatedly, the secretariat has developed a plan to develop a networked geospatial data hub that will aggregate evolving data-sharing platforms, such as the one under development by the Asian and Pacific Centre for the Development of Disaster Information Management, and will serve as the region's primary geospatial data-sharing platform in the implementation of Economic and Social Council resolution 2016/27 on strengthening institutional arrangements on geospatial information management.

Disaster-related statistics

55. The Disaster-related Statistics Framework covers the core concepts and indicators defined in the Sendai Framework and the Sustainable Development Goals, aiming to translate these complex concepts into specific instructions and technical recommendations for the production and dissemination of statistics.¹⁴ For risk assessment and post-disaster impact assessments, the Disaster-related Statistics Framework also analyses data on population, society and the economy from censuses and surveys.

56. A key output of the second work stream is to build capacities to monitor and report progress under the Sendai Framework and the Sustainable Development Goals relating to disaster risk reduction. This work stream will periodically update the Asia-Pacific Disaster Risk Atlas – the ESCAP online data and information platform developed with the support of the Asian and Pacific Centre for the Development of Disaster Information Management.¹⁵ The set of geospatial vector and raster data available in the atlas covers natural hazards, exposure of critical infrastructure in the built environment, natural resource assets and the vulnerability of urban populations. The *Asia-Pacific Disaster Risk Atlas* synthesizes data on cross-border risks and disasters, including earthquakes, floods, drought, tsunamis, cyclones and storm surges, showing where critical infrastructure is severely exposed. The future iterations of the atlas will serve as the basis for risk-informed infrastructure investment and development policy decisions. With the Asian and Pacific Centre for the Development of Disaster Information Management serving as the anchor, members of the Asia-Pacific Disaster Resilience Network will provide data with a view to continuously populating the atlas with updated geospatial and statistical data, as well as tools to support risk-informed investment decisions.

¹⁴ ESCAP/74/24.

¹⁵ ESCAP, Asia-Pacific Disaster Risk Atlas (forthcoming).

3. Implementing partners

57. The United Nations Office for Disaster Risk Reduction is a key partner that ensures consistency between the efforts undertaken under the Asia-Pacific Disaster Resilience Network and those undertaken in the context of the Sendai Framework monitoring. Furthermore, the Department of Economic and Social Affairs, which serves as the secretariat of the Committee of Experts on Global Geospatial Information Management, will be a key partner in the secretariat's work of operationalizing enhanced access to geospatial data and its integration with official statistics. The secretariat will also work with UNDP, which, in partnership with Tohoku University, Japan, and Fujitsu, is developing a global disaster statistics database.

C. Work stream 3: technology innovation and applications

1. A network of networks

58. Innovations in digital and Earth observation satellite technologies continue apace and as they converge, a wide range of application tools have been developed to provide solutions across large-scale regional as well as localized sustainable development challenges.

59. The Asia-Pacific Disaster Resilience Network encompasses the Regional Cooperative Mechanism for Drought Monitoring and Early Warning of the ESCAP Regional Space Applications Programme for Sustainable Development and the e-resilience pillar of the Asia-Pacific Information Superhighway initiative as the key network contributors to this stream of work.

2. Activities and outputs

Space applications

60. Space-based data can improve the generation and provision of timely and location-specific warnings and hence can contribute to the minimization of casualties and disruption to the livelihoods of the poor.

61. Another key application is the Drought Mechanism of the ESCAP Regional Space Applications Programme for Sustainable Development. This Mechanism clearly demonstrates how, through innovative technology, geospatial data and the development of analytical tools for in-season risk monitoring and management can be improved. In-country operationalization already achieved in Mongolia in the start-up phase will be replicated in Cambodia and Myanmar as well as in other at-risk countries that express an interest.

62. Operationalization will also involve proactively making use of technology innovation in the management of evolving drought monitoring. Besides traditional in-season monitoring in the countries, the Drought Mechanism will develop techniques to seamlessly integrate in-season monitoring into season-ahead information. Given that this work requires a coordinated effort across several institutions, this integration will be positioned as one of the niche services that the Asia-Pacific Disaster Resilience Network brings together in a comprehensive package of season-ahead and real-time monitoring and analytical information that is presented in an understandable and easy-to-use format.

Artificial intelligence applications

63. As digital quantum computing continues to grow exponentially, the next generation of forecasts will increasingly be driven by artificial intelligence applications that allow for more accuracy and specificity in predictive analysis. The key output under this work stream is the development of a five-dimensional (5D) world map system that encompasses traditional three-dimensional mapping but also goes further. By taking advantage of the technology revolution under way, it incorporates a fourth and fifth dimension related to the temporal and cognitive dimensions of mapping, respectively. Big Earth data sets will be processed and analysed using artificial intelligence. Such a system will provide deeper cognitive insights into the dynamic complexity of risk over past, present and future timespans, the impacts on people within specific contextual realities and the policy actions needed. The product will be developed for selected high-risk countries in the region.

Digital connectivity

64. To capture the full potential of technology innovation for disaster resilience, broadband for all is the essential, albeit insufficient, condition. Under the Asia-Pacific Information Superhighway initiative, and in line with Commission resolution 75/7, the focus will be on the development of resilient broadband networks that provide affordable and inclusive broadband access. Implementation will be at the subregional level through a series of technical studies, as well as knowledge, awareness and capacity development among government officials. Notably, a study on assessing the disaster exposure of existing and planned infrastructure investments will be released in 2019. The study will identify the hazard exposure and infrastructure routes, drawing on the Asia-Pacific Information Superhighway Maps jointly developed by the International Telecommunication Union and ESCAP. It will provide geo-specific information on disaster risks and vulnerabilities and heighten awareness of the need for risk-informed infrastructure investments. As disaster losses continue to increase over time, ICT network systems that have a high hazard exposure need built-in redundancies so that communication systems remain functional at all stages of a disaster. This is not a well-recognized priority. The Asia-Pacific Disaster Resilience Network will help to raise awareness and policy commitment in this regard by bringing together these work streams.

3. Implementing partners

65. The major implementing partners will be the service nodes of the Drought Mechanism, namely, the Institute of Remote Sensing and Digital Earth (China), the Indian Space Research Organization (India) and the Geo-Informatics and Space Technology Development Agency (Thailand). Keio University (Japan), through its partnership agreement with ESCAP, will bring 5D to the region, starting with specific countries located in the disaster hotspots, while the Asia-Pacific Information Superhighway initiative will be implemented in partnership with the International Telecommunication Union, regional policy think tanks such as LIRNEasia and the private sector (notably Google).

D. Work stream 4: knowledge for policy

66. In its resolution 73/7, the Commission requested the secretariat to accord priority to synchronizing multi-disciplinary support for member States in the mainstreaming of disaster risk reduction in their development strategies, in line with the Sendai Framework and the Sustainable Development Goals.

1. A network of networks

67. While noting the potential outcomes of the ongoing United Nations reform and their implications for the United Nations coordination structure at the regional level, the Asia-Pacific Disaster Resilience Network encompasses the thematic working group on disaster risk reduction of the Asia-Pacific Regional Coordination Mechanism as the main network for delivering on knowledge for policy. The Network will also draw on the expertise of the think tanks and university networks within the region and beyond.

2. Activities and outputs

Asia-Pacific Disaster Report

68. The *Asia-Pacific Disaster Report*, an ESCAP flagship publication, has been produced on a biennial basis since the disaster risk reduction programme was established by ESCAP member States in 2008. To date, it remains the only regional report on disasters. Following the practice started in the 2017 edition, the future editions of the *Asia-Pacific Disaster Report* and other knowledge products will continue to be aligned with the Sustainable Development Goals. This means that the *Asia-Pacific Disaster Report* will examine the theme of the high-level political forum on sustainable development and its regional preparatory process, the Asia-Pacific Forum on Sustainable Development, from disaster risk reduction perspectives.

Joint thematic knowledge products

69. The partnership between the ESCAP and ASEAN secretariats in producing a demand-driven analytical product – entitled *Ready for the Dry Years: Building Resilience to Drought in South-East Asia* – is an example of the potential of the Asia-Pacific Disaster Resilience Network. The Network can reveal demand for knowledge products and inform deliberations on specific policy issues for strengthened policy coordination at the subregional and regional levels.

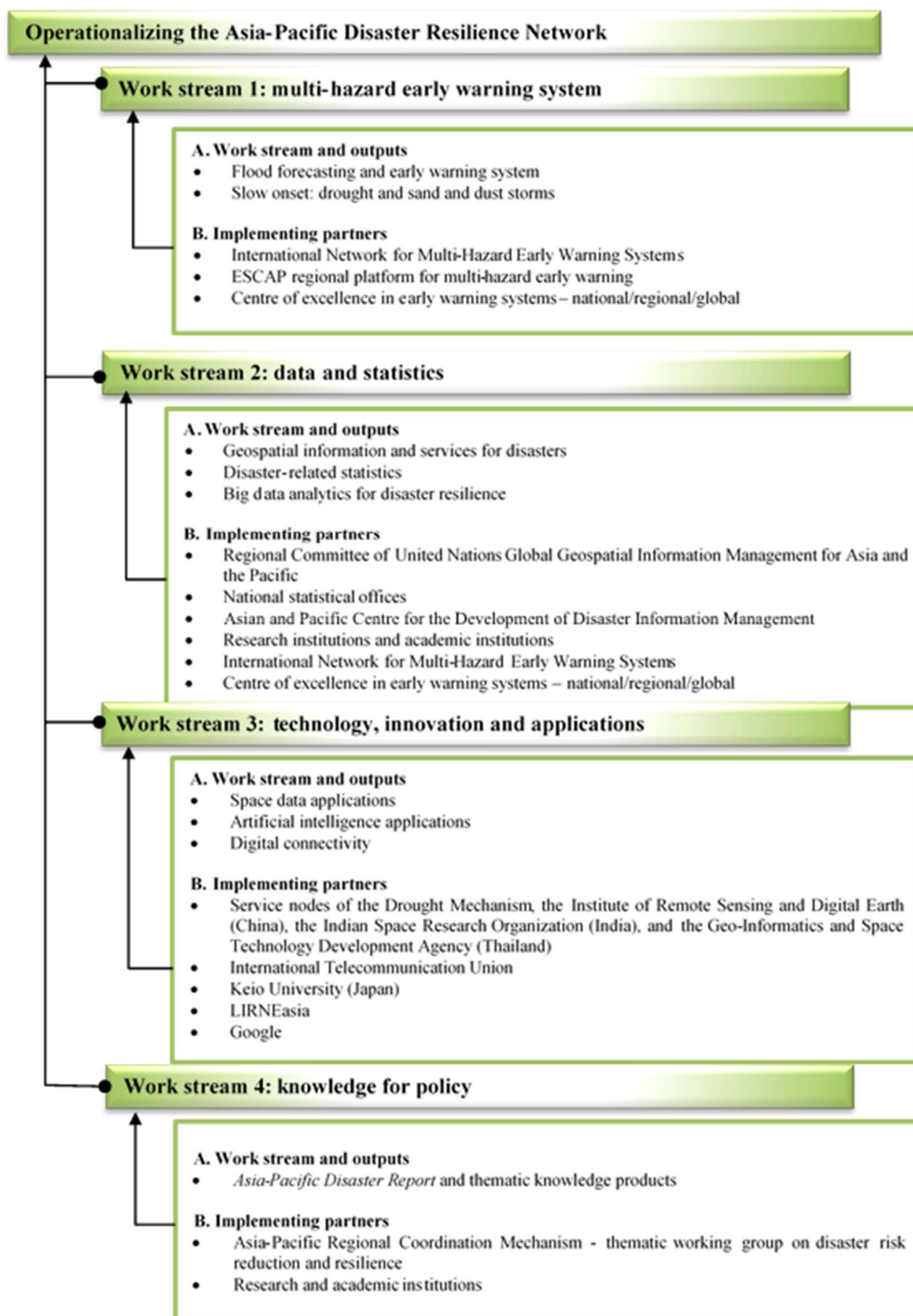
3. Implementing partners

70. The 2019 edition of the *Asia-Pacific Disaster Report* was prepared by the ESCAP secretariat with financial support provided by, inter alia, the Government of the Islamic Republic of Iran through the Asian and Pacific Centre for the Development of Disaster Information Management. Other United Nations agencies will also deliver on specific thematic knowledge products, depending on the topics involved. ASEAN will continue to be a key partner in preparing a follow-up study on drought, this time encompassing all ASEAN member countries rather than only Cambodia, the Lao People's Democratic Republic, Myanmar and Viet Nam.

IV. Monitoring and reporting

71. The work streams are summarized in figure III. The operationalization of the Asia-Pacific Disaster Resilience Network will be monitored as part of the regular monitoring of the secretariat's work programme on disaster risk reduction and statistics. Progress will be reviewed by the Committee on Disaster Risk Reduction at its seventh session in 2021 and subsequently a proposal for its 2023–2024 work streams will be tabled.

Figure III



Source: ESCAP, 2019.

V. Issues for consideration by the Committee

72. The Committee may wish to:

(a) Endorse the work streams for operationalizing the Asia-Pacific Disaster Resilience Network, 2020–2022, as highlighted in the present document;

(b) Encourage member States and partner organizations to continue supporting the implementation of the Asia-Pacific Disaster Resilience Network, 2020–2022 through financial and in-kind contributions;

(c) Actively encourage the engagement and participation of various stakeholders, such as the private sector, academia and think tanks, in the implementation of the Asia-Pacific Disaster Resilience Network, 2020–2022;

(d) Propose specific outputs and activities to be undertaken under the Asia-Pacific Disaster Resilience Network to accelerate action to build resilience in the region's disaster risk hotspots.
