

High-level Expert Consultation on Information Management Tools and Approaches for Risk-informed Sustainable Development in Asia and the Pacific

30-31 January 2018

Tehran, Islamic Republic of Iran

Concept Note

Background

Asia and the Pacific is the region most affected by disasters caused by natural hazards. The region has suffered a heavy toll —killing more than 2 million and causing estimated economic damage of about \$1.3 trillion between 1970 and 2016. The greatest impacts of disasters are in countries which have the least capacity to prepare or respond to them.

The *Asia-Pacific Disaster Report 2017*¹ shows how disaster risk is outpacing resilience. It calls attention to the alarming geographical shifts of drought risk in South Asia and South-East Asia and in the track of tropical cyclones in the Pacific. Intensification of disaster risks is also projected. The flood risk in transboundary river-basins of the region is likely to increase 2 to 6 times under moderate and severe climate scenarios. Many cities are in locations where multi-hazard risks are growing rapidly. By 2030, it is estimated that the population in the ‘extreme-risk’ areas in the region will grow by more than 50 per cent in 26 cities, and by 35 to 50 per cent in 72 cities. As a result, the number of city dwellers exposed to extreme and high risks is likely to increase significantly.

In this increasingly vulnerable region, information and knowledge management is essential for improving disaster risk management. Data and information are required for risk identification, risk assessment and risk prevention, as well as for improving preparedness and response during disasters. They are also critical for damage and loss assessments. Similarly, they are indispensable inputs to post-disaster needs assessments to guide recovery and reconstruction processes and to provide a basis for building back better. Disaster loss databases are important in accounting for the damage and losses caused by not only large-scale disasters, but also small-scale but recurrent disasters.

In this context, ESCAP member States adopted Resolution 71/11 in May 2015 on the establishment of the Asia Pacific Centre for Disaster Information Management (APDIM). As one of ESCAP’s knowledge institutions, APDIM is envisioned to promote South-South and regional cooperation, and bridge the gaps in capacity and access to information

¹ ESCAP. *Asia-Pacific Disaster Report 2017*. United Nations, Bangkok. Available from <http://www.unescap.org/publications/asia-pacific-disaster-report-2017-leave-no-one-behind>

and knowledge for disaster risk reduction and resilience. With the overarching goal of addressing the unmet needs of information management for disaster risk reduction and resilience, APDIM is being developed as a centre of excellence with three pillars, namely 1) information and knowledge repository; 2) capacity development hub; and 3) provider of information management services for cross-border disasters.

The high-level expert consultation will highlight good practices and gaps and will elicit inputs to the following areas of APDIM's programme of work:

Disaster databases

Availability and access to high-quality data and statistics are essential to monitoring the progress and supporting the implementation of the Sustainable Development Goals (SDGs) and the Sendai Framework for Disaster Risk Reduction. The global indicator framework of the SDGs provides for an integrated monitoring and reporting of certain datasets against both the Sendai Framework and the SDGs.

The *Sendai Framework Data Readiness Review* reports that data are typically available for physical damage and human impacts but less so for economic losses, losses of specific assets, such as infrastructure, cultural heritage, and disruptions to basic services.² There are ongoing efforts to develop national disaster loss databases, including the disaster-related statistics framework to bridge the existing data gaps. However, high risk developing countries continue to face the following challenges: regular collection and updating of intensive and extensive disasters; access to a range of relevant collateral data; and lack of capacity to develop information products to support risk-informed decision-making.

APDIM's work programme will address the lack of access and availability of useful data and the capacity gaps through south-south and regional cooperation. APDIM will partner with UNDP and the International Research Institute of Disaster Science of Tohoku University (IRIDeS) under the Global Centre for Disaster Statistics (GCDS). The GCDS is an important resource for tracking progress against the Sendai Framework and the associated targets in the SDGs. There are pilot projects in 7 to 8 countries in Asia-Pacific to enhance capacities in establishing baseline data; monitoring trends in damages and losses; and providing the evidence base for risk-sensitive investments and policies.

² United Nations Office for Disaster Risk Reduction (UNISDR). (2017). *Sendai Framework data readiness review 2017 - Global summary report*. Available from <https://www.unisdr.org/we/inform/publications/53080>.

Information management solutions

Disaster information management requires the organization of a spatial data infrastructure, through which geospatial data can be shared among different organizations involved in hazard and risk assessments, to produce actionable information for risk-sensitive decision-making.

Systematic baseline data and adequate risk profiling of a country can assist in designing and prioritizing risk reduction activities. The region is home to several institutions which compile a range of disaster data and have the analytical capacity to develop information products for decision-making. There are also good practices in the region, which may be adapted for building the capacities of vulnerable countries and sub-regions through the work programme of APDIM.

Risk information is often customized according to scale. At regional and national levels of planning, actionable risk information commonly uses a mapping scale smaller than 1: 1,000,000; while at the community, municipality or provincial levels, the scale can vary from 1: 1,000,000 to 1: 5,000.³

APDIM will work on developing appropriate guidelines, tools and standards to build the institutional capacity of high-risk developing member Countries, and facilitate the development of customized solutions from risk-sensitive development planning to investments; particularly in the context of resilient cities, resilient infrastructure, as well as regular monitoring and evaluation to better account for risk and vulnerability that comes with rapid urbanisation. This multi-tier information repository will provide decision-support tools for poverty alleviation, food security and environmental management efforts.

Tools and techniques for risk-informed decisions

Accumulated seismic risk is a major concern. Some cities and towns are close to fault lines and are thus exposed to high seismic risk. Lack of preparedness for earthquakes highlights the urgency of reducing seismic risk.

The Global Earthquake Model (GEM) with state-of-the-art modeling capabilities and a suite of analytical tools is utilized worldwide for the assessment and communication of earthquake risk. GEM is advanced further with the Integrated Risk Modelling Toolkit (IRMT) that provides geospatial solutions to support risk sensitive major investment decisions in high seismic risk areas.

³ ESCAP. *Asia-Pacific Disaster Report 2015*, Chapter 4. United Nations, Bangkok. Available from <http://www.unescap.org/publications/asia-pacific-disaster-report-2015-disasters-without-borders>

APDIM's partner – the Building and Housing Research Centre (BHRC) has been a part of GEM and has carried out activities to develop capacities for seismic micro-zonation in Bhutan and retrofitting of cultural monuments in Nepal. These initiatives highlight the scope for South-South cooperation to share knowledge and expertise in seismic micro zonation and retrofitting.

APDIM's work programme will develop capacities to identify and apply replicable risk assessment tools and techniques, such as multi-hazard average annual loss, deterministic models, micro-zonation and climate risk assessment through south-south and regional cooperation.

Geospatial solutions

The UN Global Geospatial Information Management (UN-GGIM) has put in place the Geospatial Information and Services for Disasters to support the implementation of the SDGs and Sendai Framework. APDIM will provide a platform for implementing the UN-GGIM's strategic framework on geospatial information and services for disasters.

On 27 July 2016, the Economic and Social Council (ECOSOC) adopted the resolution (E/2016/L.28) entitled "*Strengthening institutional arrangements on geospatial information management*" to strengthen coordination, capacity building and coherence of global geospatial information management. APDIM will provide an enabling mechanism to address the growing needs for timely and accurate geospatial information by promoting standards for national geospatial data infrastructure to support disaster risk reduction and resilience-building.

As a member of the Permanent Committee on Geographical Information System Infrastructure for Asia and the Pacific (PCGIAP), the Islamic Republic of Iran's National Cartographic Centre (NCC) has contributed significantly to strengthening information infrastructure. The NCC has demonstrated its capacity to develop spatial data infrastructure for disaster risk management following international standards. As an APDIM partner, NCC's institutional capacity and links with the PCGIAP's platform and resources can be leveraged by APDIM for strengthening disaster information infrastructure capacity in vulnerable countries.

Regional information services for cross-border disasters

The *Asia-Pacific Disaster Report 2015* highlights the cross-border nature of disasters. The analysis was based on coarse resolution maps for risk visualization. This type of analysis will be taken further through APDIM to create actionable information for risk-sensitive development planning. APDIM will assess the spatial and temporal components of transboundary risks.

Information on disaster risk is available in the public domain, with many tools providing free data and imagery. APDIM will add value to this by contextualizing existing information using geo-referencing data and linking this with social and economic parameters. Considering that many cities in Asia-Pacific are at risk to multiple hazards, APDIM's service lines will include geo-referencing cities, high-resolution mapping of exposure and vulnerability to various hazards, and production of seismic hazard maps and spatial land use maps.

Sand and dust storms are a transboundary hazard, affecting certain belts of Asia-Pacific. APDIM will serve as a repository for a geospatial database on sand and dust storms in ESCAP subregions, and will collaborate with UNCCD, UNEP and WMO for monitoring, assessment and evaluation, including in relation to the Global Assessment of Sand and Dust Storms initiative. APDIM will downscale global mapping and monitoring to regional and subregional levels. Through these endeavors, it will facilitate intergovernmental dialogue and consultation for deepening regional cooperation.

High-level Expert Consultation on Regional Cooperation for Combating Sand and Dust Storms in Asia and the Pacific

30-31 January 2018

Tehran, the Islamic Republic of Iran

Concept Note

Background

Sand and Dust Storms (SDS) substantially impact all three pillars of sustainable development—economic, social and environmental. Globally, more than 150 countries are affected directly by SDS and 45 countries are classified as SDS source areas.¹ The Global Assessment of SDS indicates that each year, approximately 2 trillion tons of dust is emitted into the atmosphere. The impacts are large scale and affect a range of SDGs related to human health, productivity, agriculture, and infrastructure, notably transport.² Reducing the harmful impacts of sand and dust storms will thus be essential to making progress on SDGs.

A large number of SDS originate in arid, semi-arid and dry sub-humid areas. However, their impacts are frequently felt outside the drylands due to the propensity of dust to be transported over long distances. The risk belts stretch from the tropical and subtropical deserts of the Sahara through the Middle East to the Great Indian Desert, as well as the mid-latitude deserts of Central Asia and China-Mongolia. With such wide transboundary impacts, managing SDS risk requires both global and regional cooperation.

In recent years, the challenge has intensified. While much of the phenomenon is a natural part of the bio-chemical cycles of the earth, an increasing percentage is generated by human-induced factors, such as poor agricultural practices as well as land and water mismanagement.³ South-West and Central Asia, are particularly hard hit, and the need for concerted and concrete global and regional actions has become urgent.⁴

The UN system is addressing this problem from various perspectives. Three specialized agencies deal with SDS globally – the World Meteorological Organization (WMO), the United Nations Environment Programme (UNEP), and the United Nations Convention to Combat Desertification (UNCCD). While WMO addresses monitoring, forecasting, and early warning through the Sand and Dust Storms Warning and Advisory Assessment System (SDS-WAS), UNEP and UNCCD

¹ Effective implementation of the Convention at national, subregional and regional level
Promotion and strengthening of relationships with other relevant conventions and international organizations, institutions and agencies; Conference of the Parties, Thirteenth session
Ordos, China, 6–16 September 2017

² Global Assessment of Sand and Dust Storms, UNEP, WMO and UNCCD, 2016

³ Global Assessment of Sand and Dust Storms, UNEP, WMO and UNCCD, 2016,

⁴ International Conference on Combating Sand and Dust Storms:
Challenges and Practical Solutions, Tehran, the Islamic Republic of Iran, 3-5 July 2017

carry out activities to mitigate SDS risk; this includes the establishment of green belts, improvements in ecosystem and land use management, as well as desertification and drought mitigation. There are also bilateral and multilateral agreements between countries for mitigation, monitoring, forecasting, and capacity building purposes.

ESCAP's mandates: regional cooperation for combating SDS

In support of General Assembly Resolution 70/195, "Combating Sand and Dust Storms" (operative paragraph 70/195), ESCAP's work is guided by ESCAP Resolution 72/7 which requests the secretariat to put in place a regional cooperation mechanism to combat sand and dust storms in Asia and the Pacific. It is also guided by UN Environment Assembly (UNEA) Resolution 2/21, "Sand and Dust Storms."

Furthermore, the need to address shared vulnerabilities through the prioritization of multi-hazard early warning systems for transboundary disasters is recognized in a number of ESCAP's policy documents, notably the *Regional Roadmap for Implementing the 2030 Agenda for Sustainable Development in Asia and the Pacific* and the *2017 Ministerial Declaration on Regional Economic Cooperation and Integration in Asia and the Pacific*.⁵

ESCAP's Committee on Disaster Risk Reduction at its 5th session in October 2017 supported efforts to bring different streams of work related to multi-hazard early warning systems, under an Asia-Pacific disaster resilience network (APDRN). The Committee was of the view that this would promote greater implementation coherence across global and regional development frameworks⁶ and that as an intergovernmental regional platform ESCAP was well positioned to promote coherence across the 2030 Agenda and Sendai Framework. APDRN is based on a multi-hazard cluster approach that includes extreme weather events, geophysical disasters and slow-onset disasters supported by enabling mechanisms and led by ESCAP and partners. In this regard, the inclusion of SDS in the regional cooperation work of the Asian and Pacific Centre for the Development of Disaster Information Management (APDIM) will be an important enabling mechanism and this was explicitly recognized by the Tehran Ministerial Declaration adopted at the International Conference on Combating Sand and Dust Storms (Tehran, 3-5 July 2017).⁷

⁵ The Ministerial Declaration on Regional Economic Cooperation and Integration in Asia and the Pacific, Bangkok, 21–24 November 2017. Second Ministerial Conference on Regional Economic Cooperation and Integration in Asia and the Pacific. Available from (http://www.unescap.org/sites/default/files/MCREI-2_L3_E.pdf).

⁶ ESCAP Committee on Disaster Risk Reduction, Fifth session, Bangkok, 10-12 October 2017 http://www.unescap.org/sites/default/files/pre-ods/CDR5_5E.pdf

⁷ Tehran Ministerial Declaration International Conference on Combating Sand and Dust Storms. Jointly organized by the Government of Islamic Republic of Iran and the United Nations, Tehran, 3-5 July 2017. Available from https://www.un.org.ir/images/Documents/sandandduststorms/Tehran_Ministerial_Declaration_03_5_July_2017.pdf.

ESCAP's Regional Cooperation Mechanism for Combating Sand and Dust Storm

Combating sand and dust storm requires accelerated actions on both adaptation and mitigation. Adaptation measures include integrated early warning and monitoring, impact assessment, and vulnerability mapping of population and infrastructure, while mitigation actions emanate from wide-ranging policies related to sustainable land and water management, that includes integrated landscape management.⁸

The drivers of SDS risk arises from multiple hazards, that over time converge, giving rise to compounding effects. This involves land degradation, desertification and climate change, compounded by unsustainable land and water use, extreme wind events, greater aridity in some areas, and more frequent and severe drought with extended duration. Droughts, typically associated with vegetation decline and drier soils, frequently result in greater SDS activity. A multi-hazard risk reduction and resilience-building approach which tackles a cluster of these inter-related slow-onset phenomena, provides a scientific basis for addressing these hazards more effectively. Furthermore, by adopting actions on a regional cooperative basis augmented impacts are attained for both adaptation and mitigation.

ESCAP's regional cooperation mechanism on SDS, as a part of the APDRN, adopts a multi-hazard risk reduction and resilience-building approach. Drawing from ESCAP's research and policy analysis, the mechanism addresses the following critical gaps:⁹

- Information – While there have been several attempts to assess desert dust sources globally which compile data from satellite borne sensors and terrestrial meteorological stations,¹⁰ significant gaps lie in the information supply chain at local, national and regional levels. Information on SDS is mostly sparse or incomplete and dispersed. Often, the information is also generic and not actionable in terms of SDS adaptation and mitigation. Furthermore, the scale of SDS risk information is quite vast, and varies from regional to national to local levels. In particular, not enough assessments have been done on the impact of SDS in various sectors, at national and transboundary levels.
- Cooperation – There is a need to deepen cooperation between countries that are SDS sources (hotspots) and the affected areas at regional as well as inter-regional levels, to bring about synergy and coherence among the various initiatives.
- Capacity – Managing SDS requires substantial capacity for risk reduction, adaptation and mitigation actions. The capacity of countries exposed to SDS, particularly in South and South West Asia as well as in North and Central Asia, needs to be enhanced substantially and guided by well-informed risk-sensitive plans of action.

⁸ Middleton, N. and U. Kang, Sand and dust storms: impact mitigation. *Sustainability* 9, 1053 (2017).

⁹ ESCAP, 2017. *Asia-Pacific Disaster Report 2017*, United Nations, Bangkok.

¹⁰ Ginoux, P.; Prospero, J.M.; Gill, T.E.; Hsu, N.C.; Zhao, M. Global-scale attribution of anthropogenic and natural dust sources and their emission rates based on MODIS Deep Blue aerosol products. *Rev. Geophys.* 2012, 50, RG3005.

Putting in place ESCAP's Regional Cooperation Mechanism – A four track-strategy

ESCAP's work program on strengthening regional cooperation for disaster risk reduction and resilience provides the foundation for our work on sand and dust storms. ESCAP has undertaken an analytical study¹¹ that outlines a conceptual framework and proposes a four track-strategy for putting in place ESCAP's regional cooperation mechanism for the mitigation of, and adaptation to, SDS. as follows:

- Addressing the drivers through a multi-hazard approach: a multi-hazard risk assessment and modelling aimed at understanding the drivers of SDS such as land degradation, poor water management, drought, desertification and climate change, in the priority sub-regions is adopted.
- Development of SDS Alert System with Monitoring and Forecast Tools: Given the strong correlation of drought, desertification and SDS in arid and semi-arid regions, the tools and techniques being developed under ESCAP's Regional Drought Mechanism are tailored for their application to SDS. The innovative remote sensing based monitoring and forecast tools such as normalized difference dust index (NDDI), Thermal Infrared Integrated Dust Index (TIIDI), Global Dust Detection Index (GDDI) are put to use for the development of SDS Alert system.
- Leveraging APDIM's information management services for enhanced technical support: APDIM, which is supported by and hosted in the Islamic Republic of Iran, is mandated to provide information management services and specialized capacity development training for transboundary hazards, including SDS. On a biennial basis, data on the multiple causes and impacts of sand and dust storms will be collected and analysed through a study that will form the basis of recurring regional assessments of SDS risk and resilience. These assessments will be considered by governments at APDIM's Governing Council meetings and ESCAP's intergovernmental Committee on Disaster Risk Reduction.
- Asia-Pacific Sand and Dust Network: Multiple stakeholders involved in the combat of SDS, including academic and policy research institutions, will be brought together in an Asia-Pacific Sand and Dust Network. The Network will support analytical work, such as periodic risk assessment mentioned above, monitoring of resilience indicators based on the Sendai/SDG Monitoring framework, development of joint action plans drawn from source as well as impacted countries, as well as from global and regional knowledge institutions.

ESCAP will work closely with the UN Environment Programme (UNEP), the World Meteorological Organization (WMO), the secretariat of the United Nations Convention to Combat Desertification (UNCCD) and other regional commissions to ensure a coordinated and comprehensive approach.

¹¹ ESCAP, Regional Cooperation Mechanism for Combating Sand and Dust Storm in Asia-Pacific (Forthcoming, 2018)

Key objectives of the High-level Expert Consultation

The high-level expert consultation will:

- Review ESCAP's study on regional cooperation and examine its feasibility for implementation based on national, regional and global efforts and recent country experiences in advancing SDS mitigation and adaptation;
- Deliberate on the form and contents of the Asia-Pacific Sand and Dust Network; and
- Explore possibilities for expanded partnerships.

The consultation is expected to open new avenues for enhanced regional collaboration and follow-up among the partners. The outcome report of the high-level consultation will be brought to the attention of the APDIM Governing Council at its second session on 31 January 2018 in Tehran and report to the Committee on Disaster Risk Reduction at its 6th session.