

International Conference on Combating Sand and Dust Storms:

Challenges and Practical Solutions

Tehran, the Islamic Republic of Iran (3-5 July 2017)

Concept Note

Background

There has been a growing awareness of the global phenomenon of Sand and Dust Storms (SDS) and their global, regional, transboundary and multi-faceted impacts on the environment, climate, health, livelihoods, agriculture and socio-economic well-being of societies in the past decades. The UN system has already started addressing this problem from various perspectives.

In 2007, the 15th World Meteorological Congress highlighted the importance of the SDS problem and endorsed the launch of the Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) with its global Steering Committee (<http://www.wmo.int/sdswas>) and three Regional Nodes: for Northern Africa, Middle East and Europe: (<http://sds-was.aemet.es>) for Asia: (http://eng.nmc.cn/sds_was.asian_rc) and for the Americas: (<http://sds-was.cimh.edu.bb/>). In February 2014, the World Meteorological Organization (WMO) established the Barcelona Dust Forecast Center, whose operations generate and distribute forecasts for North Africa, the Middle East and Europe.

The Intergovernmental Panel on Climate Change (IPCC) dedicated a section to SDS in its special report entitled: “Managing the risks of extreme events and disaster to advance climate change adaptation”, released in 2012. Also, UN Environment, WMO and the United Nations Convention to Combat Desertification (UNCCD) jointly released a first “Global Assessment of Sand and Dust Storms” in 2016. This document provided a comprehensive overview of the global distribution of SDS, their impact, their sources and possible solutions for mitigation. The UN system is also responding to Member States who have sought recognition of this global issue and urged for international cooperation to mitigate it. The United Nations General Assembly has adopted two resolutions (in 2015 and 2016) and also the UNEA and UNESCAP have adopted respective resolutions on combating SDS, in response to the request from Member States who sought international cooperation and support to mitigate this devastating problem.

The Inter-governmental Panel on Climate Change (IPCC) report¹ asserts that “heavy dust storms disrupt human activities. Dust aerosols in the atmosphere can cause a suite of health impacts including respiratory problems. The long-range transport of dust can affect conditions at long distances from the dust sources, linking the bio-geochemical cycles of land, atmosphere, and ocean. For example, dust from the Saharan region and from Asia may reach North America and South America... the driving force for the production of dust storms is the surface wind associated with cold frontal systems sweeping across arid and semi-arid regions and lifting soil particles in the

¹ Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation, Chapter 3, section 3.5.8: Sand and Dust Storms, IPCC, Cambridge University Press, 2012.

atmosphere". In the Global Assessment of SDS, the SDS phenomenon is defined as being the result of surface winds raising large quantities of dust into the air and reducing visibility at eye level (1.8 metres above ground) and, in terms of distance visible, to fewer than 1,000 metres distance.² The same assessment indicates that large sand and dust storms, resulting from a combination of strong winds and loose dry soil surfaces in arid and semi-arid areas, are detrimental to human health, agricultural land, infrastructure, and transport. It is estimated that each year approximately 2,000 million tons of dust is emitted into the atmosphere. While much of this is a natural part of the bio-chemical cycles of the earth, a significant percentage is generated by human-induced factors.³

Unsustainable land and water management are among the primary human-induced elements affecting SDS. Human-induced dust emissions occur mainly (85%) as a result of the management of hydraulic sources (ephemeral water bodies). But land degradation also contributes to climate change through production of greenhouse gases, changes in surface energy balances and direct contributions of dust to the atmosphere.⁴

Climate change is also an important potential driver of future wind erosion and SDS risk, especially the occurrence of more extreme wind events and the overall trend, in some regions, towards drier climates. But reverse effects are also possible. There are multiple feedbacks between anthropogenic dust emissions, climate and both terrestrial and ocean bio-geochemical cycles, which make it difficult to predict the impact of climate change.

As outlined in the "Global Assessment of Sand and Dust Storms" report referenced above, combating this phenomenon is integral to the success of the **2030 Agenda for Sustainable Development**. Resolving the SDS problem can contribute to: improving public health; ensuring that villages, towns and cities become more habitable; improving agricultural production; combating climate change; conserving the oceans; and protecting terrestrial ecosystems.

The increasing threat of SDS, on the other hand, undermines all efforts to achieve the Sustainable Development Goals (SDGs) in both developed and developing countries.

This is a significant challenge which has intensified in recent years in many parts of the world including the Middle East and West Asia and needs to be addressed through concerted global and regional efforts. This global problem, which has intensified dramatically in different regions during the past decade and is predicted to only get worse, urgently requires concerted and concrete regional and global collaboration and efforts from all countries, if the efforts of the regional countries to achieve SDGs are to be supported. In this regard, Iran has been extremely vocal in advocating for action in international fora.

The UN response to the request by affected Member States for international cooperation is summarized below:

- United Nations General Assembly (UNGA) Resolution: A/RES/70/195—which called for a global assessment of the SDS phenomenon, resulting in the UNEP-WMO-UNCCD 2016 report);

² Global Assessment of Sand and Dust Storms, UNEP, WMO and UNCCD, 2016, p.6.

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

⁴ Global Assessment of Sand and Dust Storms, UNEP, WMO and UNCCD, 2016, Executive Summary.

- Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) on the request of more than 40 countries and decision of the 15th World Meteorological Congress;
- United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) Resolution: 72/7—which calls for regional action to counter SDS;
- United Nations Environment Assembly Resolution (UNEA/2/21, which explores funding mechanisms for actions to counter SDS;
- United Nations General Assembly (UNGA) Resolution: A/RES/71/219—which takes note of Iran’s initiation to host an international event in Tehran in 2017 to combat SDS.

In addition to the above, the Ankara Ministerial Declaration (as well as the resulting Action Plan) in 2010 between Iran, Iraq, Syria and Turkey, created a solid basis for continued and possibly expanded cooperation. There were also two subsequent meetings at the Technical and Ministerial levels held in Tehran in September 2010, with the additional participation of Qatar. However, regional dialogue and cooperation are yet to be fully realized. Increased collaboration is therefore required.

A Technical Expert Workshop on Economic Impact Assessment of Sand and Dust Storms was held in Goyang Korea in September 2016 with the collaboration of UNCCD and UNEP. The participants agreed on an outline of economic impact assessment to develop a methodology framework.

Two large international events on SDS were organized in Tehran during 5-9 November 2016. These included a Workshop on the Use of Space Technology for Dust Storm and Drought Monitoring in the Middle East region and the 5th Training Course on WMO SDS-WAS Products (Satellite and Ground Observation and Modelling of Atmosphere Dust).

The first of these events was co-organized by the United Nations Programme on Space Applications (UN Office for Outer Space Affairs, UNOOSA) and the Ministry of Information and Communication Technology of Iran and the Iranian Space Agency in Tehran. The Workshop was primarily aimed at raising awareness and promoting the use of space technologies related to dust storm and drought monitoring for the benefit of the host country, the Middle East region and - in general - for developed and developing countries globally. The Workshop brought together stakeholders working in drought, dust or sand storm monitoring frameworks, and was attended by 200 participants, from international institutions and the following sixteen countries: Afghanistan, Austria, Azerbaijan, China, France, Germany, Iran, Iraq, Lebanon, Pakistan, Romania, the Russian Federation, Switzerland, Sudan, Tunisia and Venezuela.

The second SDS-WAS training event was co-organized by the Islamic Republic of Iran Meteorological Organization (IRIMO), the Atmospheric Science and Meteorological Research Center (ASMERC), the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), the Barcelona Dust Forecast Center (BDFC) and the WMO. It was targeted at operational and research meteorologists, although it was also attended by technicians from air quality agencies as well as early career scientists and advanced students with an interest in the earth system sciences.

The World Health Organization (WHO), the Regional Centre for Environmental Health Action (CEHA), the WMO, the United Nations Environment Programme/Regional Office for West Asia (UNEP/ROWA), the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) and the State Meteorological Agency of Spain (AEMET) organized the First Africa/Middle East expert meeting and workshop on the health impact of airborne dust in Amman,

Jordan during the period 2–5 November 2015. This workshop reviewed the scientific evidence on airborne dust and its health outcomes in the region, identifying regional and national strengths and gaps in responding to the health impacts caused by natural and anthropogenic dust. The meeting was organized as a follow up to the following technical meetings on combating sand and dust storms on 6-7 May 2013 in Abu Dhabi, United Arab Emirates; WHO/CEHA regional consultation on air quality and health, 11-12 December 2014; the World Health Assembly resolution WHA 68.8, May 2015; and the WHO consultation on available evidence for the future update of the WHO Global air quality guidelines, 30 September - 1 October 2015. More than 60 experts from the Eastern Mediterranean Region, Africa, Europe and North America focused discussions on the following technical aspects: strengthening the linkages and partnerships between meteorological, environmental and health sectors towards minimizing the impacts of airborne dust on health; reviewing the evidence on the toxicity of naturally caused air pollution; identifying research gaps and needs; contributing to the ongoing process of updating the WHO guidelines on air quality and health; and reviewing the meteorological, environmental and health interventions that help in minimizing the impacts of airborne dust on health and the environment.

Based on the recommendations of this meeting, WHO started the process of updating its air quality guidelines to accommodate for the health impacts of natural air pollution caused by dust storms, and its mitigation measures. A systematic review on health impacts of dust was already initiated in March 2017 and will be completed by the end of 2017. The findings of this review will form the basis for reviewing the current guidance norms.

An International Workshop on Sand and Dust Storms was held in Istanbul in October 2016 with the participation of regional countries and technical support from WMO, UN Environment and UNCCD. The participants of the workshop underlined, amongst other things, the need for better coordination and harmonization of efforts between UN bodies, countries in the region and different national agencies in order to avoid repetition and duplication of efforts.⁵

The UN Environment-West Asia Office in the region tackles the SDS issue, taking into account the significant work at the regional and country level. This office worked together with WMO in Iraq to produce a national strategy for mitigating SDS.

Finally, the Government of Iran, UNDP and UN Environment organized a Side Event during the 22nd Session of the Conference of the Parties (COP22) of the UN Framework Convention on Climate Change in Marrakech (November 2016) on the issue of Sand and Dust Storms. The aim of the Side Event was to both raise awareness and serve as a call to action for West Asian countries to find a way to tackle this transboundary human development challenge. At this event, Iran restated its readiness to cooperate with regional countries to overcome environmental challenges – including the SDS. The Side Event called for the: (a) development of early warning systems, and the sharing of the climate and weather information which can be used to forecast sand and dust storms, (b) promotion of measures that mitigate the worst adverse health effects of sand and dust storms where and when they happen, (c) scoping of effective preventive measures, and (d) more research. The need for collaborative action among countries in the Middle East was stressed by all speakers and the event recognized the potential for the UN to serve as a platform for such engagement.

⁵ Summary Report, “The International Workshop on Sand and Dust Storms”, hosted by the Government of Turkey, Istanbul, 4-7 October 2016.

Case Study – Mongolia

An example of one country which is particularly affected by the consequences of SDS is Mongolia. There, every springtime, people suffer from sand and dust storms directly causing mortality and morbidity among people and livestock. In Mongolia, 132 meteorological stations across the country have been observing and recording visibility of sand and dust storms since the 1970s. These historical observations have been well documented in a number of scientific international journals (e.g. Analysis of dust storms observed in Mongolia during 1937–1999). Since 2007, several dust monitoring sites in Mongolia have been operating with the support from the Korean Meteorological Administration (KMA) in the Republic of Korea, and, in Japan, the National Institute for Environmental Studies (NIES), the Nagoya the Tottori Universities. Dust model simulations are on-going using different observation data and technologies. For example, WRF-Chem dust model has been running for the past 3 years, generating a threat score.

The imperative for urgent action

The overall conclusion is that international, regional and national awareness about the global problem of SDS needs to be augmented as a matter of urgency. Moreover, regional solutions also need to be identified and then implemented. To multiply and intensify efforts at the national level, there is an urgent need to share experiences and good practices across the world. It is essential to move towards developing global methodologies and technical guidelines as well as a set of concrete recommendations and policy actions that correspond to specific regional circumstances and needs. This will require international advocacy and support, impactful national implementation, collaborative and supportive actions by the UN system and an integrated approach at all levels.

Organization of an International Conference on Combating SDS in Tehran

In accordance with UNGA Resolution A/RES/71/219, the Government of Iran will host an international conference on combating sand and dust storms, with the cooperation of the United Nations Environment Programme, the United Nations Development Programme and the Department of Economic and Social Affairs of the United Nations Secretariat, as well as other relevant United Nations entities, such as WMO, UNCCD, the RAMSAR Convention, UNOOSA, WHO and FAO, as well as collaboration with other regional and international organizations.

The International Conference on combating SDS will take place in Tehran, Iran, 3-5 July 2017. This three-day Conference will consist of a Ministerial Dialogue and plenary and thematic sessions on the 3rd and 5th of July and field visits to two separate locations in Iran on the 4th of July. The Government of Iran will be represented by the Department of Environment and the Ministry of Foreign Affairs. The co-organizers will work together on the substantive and logistics aspects of the International Conference.

Objectives of the Tehran International Conference

The International Conference will undertake an evidence-based assessment of latest reports, national, regional and global efforts and recent country experiences in advancing SDS mitigation and adaptation. The objectives include the following:

1. **KNOWLEDGE – Raise Awareness, Share knowledge and Best Practices and Enhance advocacy– to deliver an overview of the key challenges facing the affected region and countries emanating from the SDS phenomenon.** This aspect will focus on the human and sustainable development challenges posed by the SDS phenomenon, especially in light of the changing global and regional climate. The ongoing efforts to counter SDS in Iran and other parts of the West Asian regional countries as well as other regions of the world, such Oceania, Africa, North and South America, East Asia, and Europe will be presented and discussed. The main objective will be to deepen understanding of how the issue of SDS negatively affects the health, agriculture, infrastructure, socio-economic welfare and livelihoods of millions of people across the region and globally. The event will aim to increase awareness and advocacy at national, regional and global levels, and share knowledge and best practices and measures to mitigate the sources and impacts of SDS and strengthen observation, forecast and adaptive capacities of the affected countries to cope with their adverse effects.
2. **SOLUTIONS – Identify practical and integrated solutions and recommend a set of concrete actions and tools to mitigate Sand and Dust Storms and build resilience to achieve SDGs.** The UN entities and other development partners can share existing tools, technical guides and methodologies to the participants and present successful mitigation methods used globally. The aim will be to support affected countries to work together as a community to develop a plan of action and collaborative mitigation projects with the support of the international community. This can be achieved through the integration of efforts at national, regional and global levels, while aiming for the achievement of the SDGs.
3. **COLLABORATION – Promote regional and international partnerships in order to enhance increased international and regional collaboration to combat the SDS phenomenon.** This will assist countries to participate in collaborative action plans and mitigation and resilience projects to respond to SDS in their respective regions. It will also pave the way for increased synergistic support from the UN organizations to affected countries. The International Conference will explore possibilities for expanded partnerships and collaboration. The objective will be to open new avenues for enhanced regional and international collaboration and follow-up among the partners. The outcome report of the Tehran International Conference can be brought to the attention of the next UN General Assembly, the UN Environmental Assembly 3, the UN High-Level Political Forum and UNESCAP.

Main Themes of the International Conference

The themes to be addressed at the International Conference will include the following:

1. Overview of global and regional trends of Sand and Dust Storms combined with a Ministerial dialogue;
2. Social, economic and environmental impact of SDS and their costs;
3. Observation, monitoring, prediction and early warning systems;
4. Policy options, technology innovation and investment opportunities, considering cross-sectoral integrated approaches;
5. Global, regional and cross-sectoral cooperation; and
6. Conclusion and way forward.

Participation

International participants will include ministers, senior officials, country experts, international resource persons and policy makers from all regions as well as experts from regional and international organizations and UN entities.