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Sustainable development

Combating sand and dust storms

Report of the Secretary-General

Summary

The present report, submitted pursuant to General Assembly resolution [73/237](#) on combating sand and dust storms, provides details on developments within the United Nations system since the issuance of the first report of the Secretary-General on the subject ([A/73/306](#)) and covers the period from mid-2018 to mid-2019. The report highlights activities and initiatives undertaken by United Nations entities, Member States and a range of stakeholders and underscores achievements, including cross-cutting activities, made during the reporting period in the following three principal areas: monitoring, prediction and early warning; impact mitigation, vulnerability and resilience; and source mitigation.

The report identifies three key messages. First, complementarities between initiatives can be further improved and coordination strengthened to ensure an adequate collaborative United Nations system response to address the increasing challenges of sand and dust storms. The creation of a United Nations coalition on combating sand and dust storms, comprising 15 entities of the United Nations system, is aimed at securing a coordinated and integrated response from the United Nations system and its contributions to the relevant Sustainable Development Goals, and enhanced support to actions on a national, regional and global scale.

Second, notwithstanding all the efforts made by the United Nations and its Member States, there are obvious gaps in terms of data, information, knowledge, technology, capacity, finance, policy and other enabling conditions to undertake more effective and efficient actions against sand and dust storms.

Third, sand and dust storms represent a significant transboundary hazard in numerous parts of the world, underscoring the need for strong partnership and the strengthening of subregional, regional and interregional cooperation.

* [A/74/150](#).



I. Introduction

1. In its resolution [73/237](#) on combating sand and dust storms, the General Assembly requested the Secretary-General to submit to the Assembly at its seventy-fourth session a report on the implementation of the resolution and invited all relevant bodies, agencies, funds and programmes of the United Nations system to integrate, in their respective cooperation frameworks, operational programmes, measures and actions aimed at combating sand and dust storms so as to address this problem and contribute to the enhancement of, inter alia, capacity-building at the national level, the implementation of regional and subregional projects, the sharing of information, best practices and experiences and the boosting of technical cooperation in the affected countries and countries of origin, to improve the implementation of sustainable land management practices, to take measures to prevent and control the main factors of sand and dust storms and to improve the development of early warning systems as tools to combat sand and dust storms in accordance with their strategic plans. The present report details developments since the issuance of the first report of the Secretary-General on the subject ([A/73/306](#)) and covers the period from mid-2018 to mid-2019.

2. The hazards associated with sand and dust storms present a formidable challenge to achieving sustainable development in its three dimensions – economic, social and environmental. Accordingly, addressing the negative impacts of sand and dust storms will contribute to the implementation of the Sustainable Development Goals and the achievement of the associated targets adopted as part of the 2030 Agenda for Sustainable Development (see resolution [70/1](#)). Ensuring that global efforts to achieve sustainable development are not undermined by the multidimensional impacts of sand and dust storms requires an understanding of disaster risk for prevention and mitigation and for the development and implementation of appropriate preparedness and effective response to disasters, as outlined in the Sendai Framework for Disaster Risk Reduction 2015–2030, endorsed in resolution [69/283](#).

3. In providing information and updates on global efforts to combat sand and dust storms, in alignment with the Sustainable Development Goals, the present report draws on contributions from the United Nations Environment Programme (UNEP), the secretariat of the United Nations Convention to Combat Desertification, Particularly in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, the World Meteorological Organization (WMO), the Economic and Social Commission for Western Asia (ESCWA), the Economic and Social Commission for Asia and the Pacific (ESCAP), the United Nations Development Programme (UNDP), the Food and Agriculture Organization of the United Nations (FAO), the World Health Organization (WHO) and the United Nations Office for Disaster Risk Reduction.

II. Developments since the issuance of the first report of the Secretary-General on combating sand and dust storms

A. Cross-cutting developments

4. Pursuant to paragraph 4 of General Assembly resolution [72/225](#), UNEP has made progress towards the establishment of an inter-agency network involving relevant United Nations system entities, within their respective mandates and existing resources, with the aim of enhancing United Nations system-wide cooperation and coordination on the sand and dust storms agenda, to ensure a more coherent and consistent approach to tackling sand and dust storm issues at the global, regional and

national levels, as appropriate. A proposal by UNEP to create the United Nations Coalition on Combating Sand and Dust Storms was agreed by the United Nations Environment Management Group at its meeting at Headquarters in New York on 24 September 2018. Fifteen United Nations entities have nominated their focal points to the Coalition. The first meeting of focal points of the Coalition was held on 14 February 2019 by videoconference. Representatives from ESCAP, ESCWA, FAO, UNEP, the secretariat of the United Nations Convention to Combat Desertification, UNDP, the Economic Commission for Europe, the United Nations Human Settlements Programme (UN-Habitat), WMO and the World Bank attended the meeting.

5. Draft terms of reference, including the objectives, approach and areas of collaboration of the Coalition, have also been prepared. The Coalition aims to:

(a) Promote and coordinate a collaborative United Nations system response to the growing issue of sand and dust storms on a local, regional and global scale, ensuring that unified and coherent action is taken;

(b) Facilitate the exchange of knowledge, data, and best practices among Coalition members to promote effective and coherent action on sand and dust storms across the United Nations system;

(c) Encourage and promote collaboration on initiatives and action within the members of the Coalition on sand and dust storms, including advocacy and funding initiatives;

(d) Facilitate dialogue and collaboration among affected countries and the United Nations system in addressing sand and dust storm issues collectively;

(e) Facilitate the capacity-building of Member States, raise their awareness and enhance their preparedness and response to sand and dust storms in critical regions.

6. Five working groups are proposed for collaboration, based on a disaster risk management approach:

- Adaptation and mitigation
- Forecasting and early warning
- Health and safety
- Policy and governance
- Mediation and regional collaboration

7. A sand and dust storms day is envisaged on 6 September 2019, during the fourteenth session of the Conference of the Parties to the United Nations Convention to Combat Desertification, to be held in New Delhi, to raise awareness, inspire dialogue and foster collaboration among various stakeholders on sand and dust storms. The activities planned for the day include a meeting of the Coalition, to which affected countries and other stakeholders, together with United Nations agencies, will be invited. The outcomes of the day and the Coalition discussions will ultimately contribute to deliberations of the Conference of the Parties on sand and dust storms and the future activities of the Coalition.

8. The establishment of the Coalition was highlighted in United Nations Environment Assembly resolution 4/10 on innovation on biodiversity and land degradation,¹ in which the Assembly requested the Executive Director of UNEP to

¹ UNEP/EA.4/Res.10.

address the issues associated with sand and dust storms, noting the great challenge that they pose to the sustainable development of affected regions.

9. The secretariat of the United Nations Convention to Combat Desertification has been collaborating with the North-East Asia Desertification, Land Degradation and Drought Network. The Network is a cooperation platform established in 2011 to support the implementation of the Convention in the region, with an emphasis on mitigating the impacts of sand and dust storms, through various means including capacity development and source management. Active members of the Network include China, Mongolia and the Republic of Korea, which have agreed on a subregional plan of action. The secretariat has been assisting in the implementation of a cooperative sand and dust storms source management project in the China-Mongolia border area.

10. In January 2019, the secretariat of the United Nations Convention to Combat Desertification organized a global capacity-building training fair in Georgetown, on the margins of the seventeenth session of the Committee for the Review of the Implementation of the Convention. The training module on sand and dust storms was prepared and presented in collaboration with UNEP and WMO and with the assistance of the Caribbean Institute for Meteorology and Hydrology, a regional centre of the WMO Sand and Dust Storm Warning Advisory and Assessment System.

11. UNEP, together with WMO, hosted a technical scoping meeting in Geneva on 15 and 16 April 2019 with key United Nations partners, including ESCAP, FAO, the secretariat of the United Nations Convention to Combat Desertification and WHO, as well as sand and dust storm experts, to discuss and agree on the way forward for a UNEP project on sand and dust storms. The objectives of the technical scoping meeting were to develop a theory of change to combat sand and dust storms – showing the chain of results from outputs to impacts and the related assumptions and drivers that influence the results chain – to determine potential project themes, outcomes and outputs, to outline the relative roles of UNEP and other agencies and to identify potential funding donors and partners.

12. ESCAP work on sand and dust storms has continued on three main fronts: developing parametric triggers identified through satellite imagery, as well as medium- and long-term modelling of patterns, for operationalization of a sand and dust storm alert system; 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 developing an action plan for slow-onset disasters, including sand and dust storms, involving member countries from South-West and Central Asia and key partners, including UNEP, the secretariat of the United Nations Convention to Combat Desertification, WMO, UNDP and other members of the Coalition. These initiatives were reviewed on 18 and 19 December 2018 by the Governing Council of the Asian and Pacific Centre for the Development of Disaster Information Management, an ESCAP regional institute based in Tehran, which recommended the establishment of a subregional cooperation mechanism in South-West and Central Asia. In May 2019, at its seventy-fifth session, the ESCAP Commission endorsed these decisions of the Governing Council.

13. Several other recent international meetings have included a significant focus on sand and dust storms. At the Africa-Arab Platform on Disaster Risk Reduction, held in Tunis from 9 to 13 October 2018, FAO organized a high-level panel including representatives from the Governments of Algeria, Iraq and Tunisia, the League of Arab States and WHO to better understand interlinkages between sand and dust storms and the agriculture sector, as well as to enhance dialogue between countries in the region affected by sand and dust storms and to encourage the sharing of

knowledge, experiences and best practices for managing and mitigating sand and dust storm effects.

14. The Government of Turkey hosted the sixth international workshop on sand and dust storms in Istanbul from 12 to 15 November 2018, with the support of WMO, UNEP and the secretariat of the United Nations Convention to Combat Desertification.

B. Monitoring, prediction and early warning

15. The secretariat of the United Nations Convention to Combat Desertification is developing a global base map of sand and dust storm sources, in collaboration with UNEP and WMO. The map is designed to provide baseline information on sand and dust storm source areas, including hotspots, which can be used in planning and implementing sand and dust storm policy, including source management, risk and impact assessment and early warning. Global coverage will be achieved through a set of georeferenced numerical maps at 1-km resolution and built upon publicly available and open-access global data sets and information. The global base map of sand and dust storm sources focuses on soil surface status, including parameters such as soil texture, structure, moisture content and temperature, in combination with vegetation coverage, to better detect active and dormant sand and dust storm sources, taking into account seasonality and extreme weather conditions such as drought. The map will contribute to the understanding of sand and dust storm transport pathways and help to identify small-scale, point sources.

16. This information is required in planning mitigation actions related to sand and dust storm sources, as well as source monitoring, early warning, and risk, impact and vulnerability assessments, and can be complemented by data reported by Member States in the Sendai Framework monitor for targets (a) to (d) for damage and loss disaggregated by hazard. As detailed in the 2019 *Global Assessment Report on Disaster Risk Reduction*,² risk is not siloed or stagnant, but systemic and dynamic, and must be addressed within and across systems to build resilience, with the interplay between the drivers of disaster risk, such as climate change and environmental degradation, acknowledged. Reporting through the Sendai Framework monitor is a crucial step towards a better understanding of risk, the integration of disaster risk management into the Sustainable Development Goals and the monitoring of the Sendai Framework. Disaster risk reduction is essential to addressing the challenges of sand and dust storms; in the implementation of the Sendai Framework, countries experiencing sand and dust storms should consider the hazard when developing national and local disaster risk reduction strategies (target (e)) and should ensure that early warning for sand and dust storms is considered and reported under target (g).

17. A sand and dust storms early warning system for Burkina Faso, designed and generated by the State Meteorological Agency of Spain and the Barcelona Supercomputing Centre in collaboration with the Burkina Faso national meteorological agency, became operational in October 2018. The warning advisory system³ is a product based on the multi-model forecast produced daily by the WMO Sand and Dust Storm Warning Advisory and Assessment System Regional Centre for Northern Africa, the Middle East and Europe. The system, which was featured in a demonstration at the eighteenth World Meteorological Congress in Geneva on 11 June 2019, issues warning advisory levels for each of the 13 administrative regions of Burkina Faso using colour-coded maps that indicate the risk of high dust concentrations during the next 48 hours. The Regional Centre for Northern Africa, the Middle East and Europe has delivered training events on sand and dust storms,

² See <https://gar.unisdr.org/>.

³ See <https://sds-was.aemet.es/forecast-products/burkina-faso-warning-advisory-system>.

most recently in Ahvaz, Islamic Republic of Iran (November 2018), and Aveiro, Portugal (February 2019).

18. Capacity-building on sand and dust storms at meteorological offices in the Arab countries will be provided by the new Arab Centre for Climate Change Policies, established by ESCWA in June 2018. The Centre will deliver training workshops on the development of early warning systems and conduct assessment studies of the socioeconomic impacts of sand and dust storms in the Arab countries. Early warning of extreme events, including sand and dust storms, was the subject of the third Arab Climate Outlook Forum meeting, held in November 2018 at the Egyptian Meteorological Authority in Cairo. Stakeholders from the environment, agriculture and water resources sectors assessed how seasonal predictions could be used to enhance the resilience of those sectors and prepare risk assessment plans based on services and products of the Arab Climate Outlook Forum.

19. ESCAP has developed its forthcoming Asia-Pacific Disaster Risk Atlas with a specific focus on sand and dust storms. The Atlas presents geospatial transboundary information on sand and dust storm hazards, along with the exposure and vulnerability of populations, economic stocks and critical infrastructure in the Asia-Pacific region. It also provides analytical tools that identify the sand and dust storm transboundary risk corridors in Central and South-West Asia, as well as in North and East Asia. The tools help to capture sand and dust storm hotspots, such as the Sistan basin, which straddles the south-eastern part of the Islamic Republic of Iran, south-western Afghanistan and north-western Baluchistan in Pakistan. Together, the data presented form a cloud-based information platform that supports sand and dust storm monitoring, prediction and early warning in the Asia-Pacific. A prototype of the platform was featured in a demonstration at the Expert Consultation on Regional Cooperation for Building Resilience to Slow-Onset Disasters including Sand and Dust Storms and Information Management for Cross-border Disasters in Asia and the Pacific, held in Tehran on 5 and 6 November 2018. The analysis, key findings and policy responses recommended will be presented in the forthcoming 2019 edition of the *Asia-Pacific Disaster Report* of ESCAP.

C. Impact mitigation, vulnerability and resilience

20. The impacts of sand and dust storms are both direct and indirect and felt in multiple sectors, so assessing the diverse effects presents significant methodological challenges. ESCAP has developed a methodological framework for transboundary impact assessment using sand and dust storm geospatial data and analytical tools, an approach which, for example, highlighted that in Afghanistan, Iran (Islamic Republic of), Pakistan and Turkmenistan, more than 65 per cent of the population and more than \$2.5 billion of economic stock were found to be exposed to sand and dust storms.⁴ In those countries, critical infrastructure in sectors such as transport and energy is also severely exposed. In the transport sector, 60 per cent of 124 airports, 20 per cent of 16 maritime ports and 55 per cent of highway routes are at risk of exposure to sand and dust storms. In the energy sector, sand and dust storms can reduce energy production by reducing the efficiency of wind turbines and solar panels. Of the total 134 solar and wind power plants in the four countries, approximately 75 per cent are at risk from sand and dust storms. In other words, more than 85 per cent of the total electrical capacity derived from renewables is at risk. The methodological framework was pilot tested when Afghanistan, Iran (Islamic Republic

⁴ ESCAP, based on Moderate-Resolution Imaging Spectroradiometer (MODIS) imagery from the National Aeronautics and Space Administration (NASA), 28 May 2018. For a full analysis, see the 2019 *Asia-Pacific Disaster Report* (forthcoming).

of), Pakistan and Turkmenistan were affected by transboundary sand and dust storms in May 2018. Approximately 12 per cent of the total economic stock and 22 per cent of the population were estimated to have been affected. Furthermore, around 35 per cent of power plants, or 60 per cent of total capacity, were affected, while in the transport sector, 22 per cent of airports and 35 per cent of maritime ports were estimated to have felt the impact. The impact on the energy, transport and information and communications technology sectors provided an evidence-based economic case for investment in impact mitigation, vulnerability reduction and sand and dust storm resilience-building.

21. The impact of sand and dust storms on human health is critical and multifaceted. WHO organized the first global conference on air pollution and health in collaboration with other United Nations system agencies in Geneva from 30 October to 1 November 2018, gathering about 800 participants from government ministries of health, environment and energy, city representatives, civil societies, researchers and philanthropists. During the first day of the conference, a special session on the health effects of sand and dust storms was presented. A pre-conference workshop was also organized on assessing the short-term health effects of desert dust. As part of the workshop, an outline and provisional conclusions of a specially commissioned WHO systematic review of the health effects of sand and dust storms were presented.

22. The secretariat of the United Nations Convention to Combat Desertification has been developing a comprehensive collation of material designed to provide information and guidance on how to assess and address the risks posed by sand and dust storms and plan actions to combat their impacts. The Sand and Dust Storms Compendium: Information and guidance on assessing and addressing the risks posed by sand and dust storms (ICCD/COP(14)/17, annex) has been developed in collaboration with the Convention's science-policy interface and relevant United Nations entities, including UNEP, WMO, WHO, the United Nations Office for Disaster Risk Reduction, the Office for Outer Space Affairs, the United Nations Platform for Space-based Information for Disaster Management and Emergency Response, UNDP, FAO and the United Nations Entity for Gender Equality and the Empowerment of Women (UN-Women).

23. The Compendium draws together information and guidance from a wide range of sources. It includes approaches and methodology frameworks for data collection, assessment, monitoring, forecasting, early warning, impact mitigation and preparedness, source mapping and anthropogenic source mitigation. This information is required in the development and implementation of gender-informed policies related to sand and dust storms at the subnational, national, regional and global levels, taking into account the principles set out in the secretariat's policy advocacy framework for sand and dust storms (see ICCD/COP(13)/19 and ICCD/COP(13)/19/Corr.1) and the cross-sectoral and multidisciplinary nature of the impact that sand and dust storms can have on society, the economy and the environment. Building on the Sand and Dust Storms Compendium, the secretariat of the Convention, in collaboration with UNEP and WMO, has also been developing training modules and e-learning materials on sand and dust storms risk management.

24. Building the resilience of agricultural livelihoods is central to the work of FAO in supporting countries, and contributions towards mitigating the negative effects of sand and dust storms on agriculture are made through the mainstreaming of disaster risk reduction and climate change adaptation in agriculture policies and practices, and by managing drought in more proactive ways and preventing its negative impacts. FAO is in the process of formulating an interregional project to improve the knowledge base needed to enhance resilience against sand and dust storms in agriculture, targeting countries in which agriculture is a source of, or greatly affected by, sand and dust storms. FAO is also implementing a stocktaking of land degradation

(including sand and dust storms) in the Near East and North Africa region in collaboration with the International Centre for Advanced Mediterranean Agronomic Studies and the World Overview of Conservation Approaches and Technologies.

D. Source mitigation

25. Much work towards mitigating sand and dust storm issues at source has been carried out as part of the Land Degradation Neutrality Target Setting Programme, driven by target 15.3 of the Sustainable Development Goals, which is to achieve land degradation neutrality worldwide by 2030. The Programme is led by the secretariat of the United Nations Convention to Combat Desertification in collaboration with multiple international partners, including FAO, UNDP and UNEP. Sustainable land management and restoration interventions can be used to mitigate and adapt to the adverse effects of sand and dust storms, although the extent to which source mitigation was explicitly addressed by countries in the land degradation neutrality target setting process is not clear in every case. Nonetheless, such interventions can help to control the anthropogenic drivers of sand and dust storms, such as unsustainable use of agricultural land, deforestation, overgrazing, depletion of water sources and industrial activities. As at the end of May 2019, 122 countries had committed to setting land degradation neutrality targets and 84 of those countries had validated their targets.⁵

26. The Global Mechanism of the United Nations Convention to Combat Desertification, in collaboration with the secretariat, has assisted Iraq, Mongolia and Pakistan in setting national voluntary land degradation neutrality targets and mapping land degradation transformative projects, taking into account sand and dust storms source mitigation. The secretariat of the Convention has also been assisting five countries (Kazakhstan, Mongolia, Nigeria, Turkmenistan and Uzbekistan) in developing and piloting policy and implementing frameworks related to sand and dust storms. The focus has been on anthropogenic source management, as well as impact mitigation.

27. The mitigation of sources of sand and dust storms in the area of the Great Green Wall for the Sahara and the Sahel Initiative, which involves 11 Sahelo-Saharan countries⁶ under the leadership of the Pan-African Agency of the Great Green Wall and the African Union, received a boost in May 2019 when the Government of China approved, under its cooperation programme with UNEP, a project entitled “Joint research on practical technology to combat desertification for African priority countries of the Great Green Wall”, with a total budget of about \$1.3 million for the period 2019–2021. The project’s aims are to assess the key processes of desertification, develop practical technologies for sand dune fixation, shelter belt forest management, grassland restoration and sustainable livelihoods, and propose a technical scheme for desertification control for the Great Green Wall Initiative.

28. Notable meetings relevant to sand and dust storm source mitigation organized by FAO, in collaboration with several partners, include a technical workshop in Rome (February 2019) and a round-table event during the Near East and North Africa Land and Water Days in Cairo (April 2019) to discuss sand and dust storms as part of an initiative to counter land degradation in the Mediterranean region. The Global Symposium on Soil Erosion, convened at FAO headquarters in Rome from 15 to 17 May 2019, included a discussion on the assessment and impact of soil erosion by water and wind. In the field, FAO continues to support countries affected by sand and

⁵ The figures will be reported in document ICCD/CRIC(18)/7.

⁶ Burkina Faso, Chad, Djibouti, Eritrea, Ethiopia, Mali, Mauritania, Niger, Nigeria, Senegal and Sudan.

dust storms by promoting sustainable land use management, agroforestry, shelter belts, afforestation/reforestation and land restoration programmes, which all contribute to sand and dust storm source mitigation.

III. Conclusions

29. There is a growing appreciation of sand and dust storm issues as the topic gains wider recognition as a result of the economic, social and environmental costs involved. At the same time, many uncertainties remain in the understanding of the global dust cycle and its interactions with human society. There remains a very limited observational database, both geographically and through time, owing to the paucity of suitable dust observations and the complexity of extracting specific dust signals from remote sensing imagery.⁷ Risk and vulnerability assessments for sand and dust storm hazards are in their infancy, as are economic impact assessments, and the details of how those hazards are manifest for critical areas such as human health remain elusive. Investigations of how best to transform sand and dust storm forecasts into useful warnings to people and other end user communities, such as the aviation industry, solar energy plant managers and health professionals, are also in the early stages.⁸ Much focus has rightly been given to the negative socioeconomic and environmental impacts of sand and dust storms, but some effects are positive for society and the planet, such as the fertilizing effect of dust deposition on oceans and soils, and it is important to keep this in mind while conducting activities designed to combat sand and dust storms.

30. Sand and dust storms represent a significant transboundary hazard in numerous parts of the world, underscoring the need for strong partnership and the strengthening of subregional, regional and interregional cooperation. Existing precedents for such partnerships and cooperation mechanisms can provide knowledge, data and best practices to be shared and exchanged. Coordinated action by the United Nations system will assist affected country Governments and other stakeholders in facilitating dialogue and collaboration on addressing sand and dust storm issues collectively and in building capacity, raising awareness and enhancing preparedness as part of efforts towards the achievement of the 2030 Agenda for Sustainable Development.

31. As highlighted in the present report, a broad group of United Nations bodies, agencies, funds and programmes and other related organizations are pursuing efforts to combat sand and dust storms in accordance with their relevant mandates and responsibilities. However, complementarity between individual initiatives can be enhanced and coordination further improved to maximize the impact of the United Nations system response to the growing issue of sand and dust storms. The creation of the United Nations Coalition on Combating Sand and Dust Storms, comprising 15 entities of the United Nations system working on sand and dust storm issues, will strengthen the United Nations response to an issue that remains a serious challenge to the achievement of the Sustainable Development Goals and associated targets. As part of the efforts towards adopting a disaster risk management approach, one of the most critical functions of the Coalition will be to promote and coordinate the response, on a local, regional and global scale, to promote unified and coherent action.

⁷ WMO Airborne Dust Bulletin, No. 3, May 2019.

⁸ See www.cost.eu/actions/CA16202/#tabs|Name:overview.