Sand and Dust Storms (SDS) Context

- SDS in UNCCD: “Mineral dust” coming from bare land
- 2,000 million tons of dust is emitted from land surface annually
- Globally 151 UNCCD country parties (77%) are affected by SDS
- Transboundary problem
Sand and Dust Storms (SDS) Context

- Loss of 12.7 Billion USD in GDP per annum in the MENA region alone
  - Minimum ann. cost estimation is USD 190 M in oil production and exploration (Kuwait)
- Wind erosion = hazard in many environments (ex. Agricultural land)
- Treat to health: meningitis, cardio-vascular and respiratory disease
- DLDD is a driving force of the SDS hazards
Sand and Dust Storms (SDS) Context

- SDS are natural processes
  - Global-scale coupling between the lithosphere and the atmosphere, biosphere, hydrosphere, cryosphere
  - Dust plays a critical role in the Earth System
    - Algal blooms
    - Climate change
    - Desert varnish formation
    - Ocean sedimentation
    - Sediment input to streams
    - Soil erosion
    - Plant nutrient gain
    - Salt deposition and groundwater salinization
    - Calcrete development
    - Coral reef deterioration
    - Loess formation
    - Glacier Mass budget alteration
    - Rainfall acidity/alkalinity
    - Soil nutrient gain
Sand and Dust Storms (SDS) Context

<table>
<thead>
<tr>
<th>Emission</th>
<th>Suspension</th>
<th>Deposition</th>
</tr>
</thead>
</table>
| Soil erosion  
Saltation/suspension/deposition  
Socio economic impact (health problem, economic loss, transportation, infrastructure) | Interaction with climate variables  
Contamination with air pollutants (oxidation)  
Micro organism carrier  
Transport hazard  
Disease transmission | Loess composition  
Nutrient effect on land and ocean ecosystem  
Animal (insect) behavior  
Glacier melting  
Contamination in soil and water  
Micro organism carrier  
Socio-economic impact (Health, Economic loss, Transportation, Infrastructure) |

<table>
<thead>
<tr>
<th>Primary impact/interaction</th>
<th>Secondary impact/interaction</th>
<th>Particle Movement</th>
</tr>
</thead>
</table>
| Soil fertility loss  
Plant productivity decrease  
Undermining of structures | Net climate effect: cooling or heating  
Effects on clouds and raindrops | Climate regulator (CO2 uptake)  
Secondary environmental impact  
Insects balance  
Marine biochemistry cycle disturbance |

<table>
<thead>
<tr>
<th>Source area</th>
<th>Transport</th>
<th>Destination(Impact) area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential Contaminants</td>
<td>Air pollution matter (NOx, SOx)</td>
<td>Air pollution matter (NOx, SOx)</td>
</tr>
</tbody>
</table>
Global interventions related to SDS

- **2015**
  - UNCCD COP decision 3/COP.12
  - UNGA resolutions 70/195
  - World Health Assembly resolution on air quality and health
  - Sendai Framework for Disaster Risk Reduction 2015-2030

- **2016**
  - UN Environment Assembly II resolution 2/21
  - UNGA resolution 71/219
  - UNESCAP resolution on regional cooperation to combat SDS

- **2017**
  - UNCCD COP decision 31/COP.13
  - UNGA resolution 72/225
Sand and Dust Storms as Hazards

- Composite hazards: sand, dust, storm (wind) and other factors
- Slow on-set vs. rapid on-set (i.e. haboob)
- A single hazard can be defined by the factors
  - special coverage(or magnitude), intensity, duration and frequency
- Magnitude of scale: local vs. global
- Low salience
  - not positioned in mainstream natural hazard or disaster research
  - local and regular SDS are considered as part of life
  - low physical impacts, fragmented research, lack of hazard assessment
- Natural vs. human induced (i.e. dust bowl)
Two-fold approach for SDS management

Impact mitigation
- SDS monitoring and early warning
- Risk/impact/vulnerability assessment & mapping
- Adaptation/preparedness strategy

Source mitigation/management
- Sustainable land management
- Integrated landscape management
- Integrated water management
UNCCD Policy Advocacy Framework for SDS

• **Goal**
  - Reduce societal vulnerability to SDS by mitigating the impacts of wind erosion and SDS

• **Focus areas**
  - post-impact crisis management (emergency response procedures)
  - pre-impact governance to strengthen resilience, reduce vulnerability and minimize impacts (mitigation)
  - preparedness plans and policies.
UNCCD Advocacy Policy Framework for SDS

• Objectives
  - To develop national SDS policy based on the philosophy of risk reduction
  - To enhance north-south and south-south cooperation
  - To strengthen SDS early warning systems and information dissemination
  - To reduce the number of people affected by SDS
  - To reduce the economic losses and damage caused by SDS
  - To strengthen resilience and reduce SDS impacts on basic services
  - To reduce erodibility and the extent of anthropogenic SDS source areas
  - To enhance scientific understanding of SDS
  - To enhance coordination/cooperation among stakeholders in SDS action
  - To increase financial opportunities
UNCCD Policy Advocacy Framework for SDS

- **Principles**
  - *establish a clear set of principles or operating guidelines* to govern the management of SDS and its impacts;
  - *be consistent and equitable* for all regions, population groups bearing in mind gender, and economic sectors, and consistent with the SDGs;
  - *address dust sources* occurring in various environments including drylands, agricultural fields, coastal areas and high latitude;
  - *be coordinated in international and regional contexts*;
  - *be driven by prevention rather than by crisis.*
### Early warning
- SDS monitoring and early warning/forecasting
- Health early warning

### Impact mitigation
- SDS risk management
- Vulnerability and resilience
- *ex ante* and *ex post* measures for impact mitigation

### Source mitigation
- SDS source monitoring
- Mitigation of anthropogenic sources
- Regional/global cooperation
Elements of comprehensive SDS management

**SDS Monitoring & Forecasting**
- Prediction
- Monitoring
- Forecasting
- Advisory
- Trajectory

**Communication & Dissemination**
- Broadcasting
- Messaging
- Awareness raising
- Health advisory

**Resilience & Preparedness**
- Emergency plan
- Capacity building
- Ex ante / Ex post measures

**Source Information**
- Identification
- Mapping
- Source vulnerability
- Monitoring

**Risk Assessment**
- Hazard Analysis
- Vulnerability Analysis
- Vulnerability mapping

**Community**

**Engineering**
- Building standard

**Mitigation & Prevention**
- Source Management
Implementation of SDS policy
Enhanced knowledge and information for a better SDS policy

Scientific Communities, Academia, Practitioners
- SDS source mapping and monitoring
- SDS trajectory
- Early warning and advisory (health, agriculture)
- Comprehensive impact and risk assessment
- Vulnerability assessment and mapping
- Integrated land/water management
- Land/water use regulation
- Engineering/building standard
- Ante/post measures
- Technical cooperation (data collection and accessibility)

Agencies and Authorities
Coordination and cooperation for comprehensive SDS management

Disaster management
Meteorological service
Land and Water management
Health Authority
Emergency response
Others

Community
Increased Resilience & Preparedness

Iterative process
UNCCD COP 13 decisions on SDS

• COP adopted 4 decisions related to SDS
  - SDS Policy Advocacy Framework, partnership
    Capacity building, LDN

• Parties;
  - to use the Policy Advocacy Framework
  - to mainstream SDS in national disaster risk reduction
  - to explore options to integrate SDS in voluntary Land
    Degradation Neutrality (LDN) target setting
  - to promote cooperation and facilitate information
    exchange, knowledge sharing and transfer
UNCCD COP 13 decision on SDS

Secretariat’s mandate:

• Collaboration with other relevant organizations in assisting parties to implement SDS policy and activities on SDS
• Participation in UN system-wide coordination, if appropriate
• Fostering partnerships for capacity development for mitigation of the impacts of SDS
• Science-Policy Interface engagement in SDS relevant documents

• Invited UN entities and concerned parties to assist affected countries in developing and implementing national and regional SDS policy
Key pillars of SDS action 2018-2019 & beyond

- Early Warning & Data/Information Sharing
  - Partnership (WMO) and capacity building (regional, national)

- Vulnerability and resilience
  - Technical guide
  - Vulnerability mapping, Risk/Economic impact assessment

- Source mitigation
  - Source mapping as baseline for mitigation (JRC, UNOOSA)
  - LDN integration and innovative financing for transformative projects (?GM)
SDS technical guide – a tool kit for national policy making

- SDS disaster risk reduction
- SDS policy advocacy framework
- Methodology framework of risk assessment
- Methodology framework of economic impact assessment
- Methodology framework of vulnerability mapping
- Comprehensive early warning systems for SDS
- Framework for SDS source management under the LDN context
SDS management contributes to achieving SDGs

1. NO POVERTY
2. ZERO HUNGER
3. GOOD HEALTH AND WELL-BEING
6. CLEAN WATER AND SANITATION
11. SUSTAINABLE CITIES AND COMMUNITIES
13. CLIMATE ACTION
15. LIFE ON LAND
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