



# Sandstorms in Libya: The Urgent Need for Policy Intervention

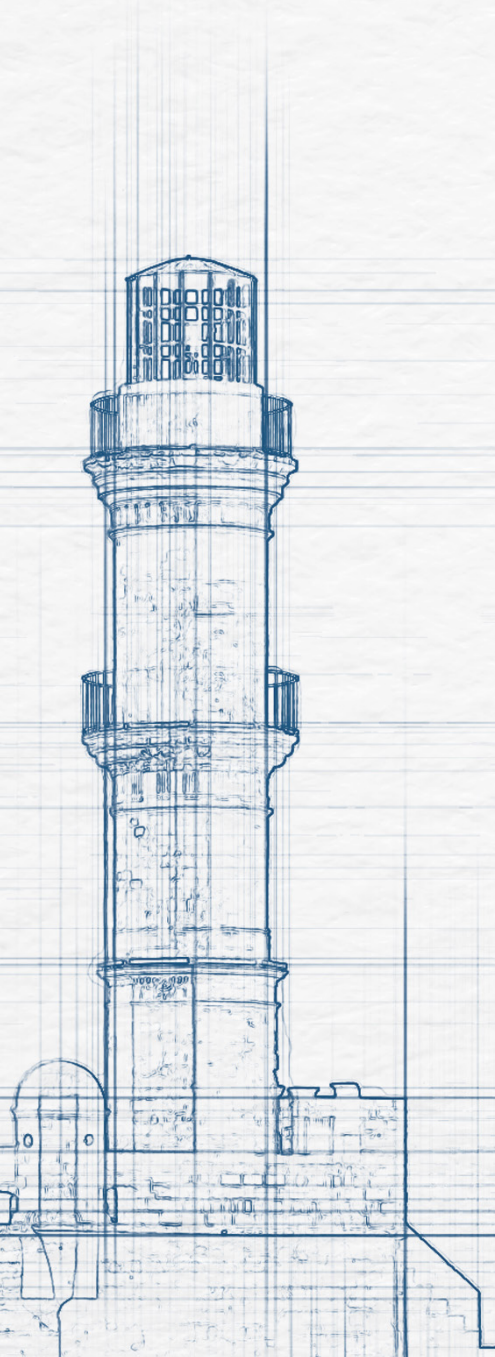
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## Executive Summary

Libya, situated in the world's dustiest region, is frequently afflicted by intense sand and dust storms, posing significant climate challenges with adverse effects on health, agriculture, and the economy. Addressing these challenges necessitates mitigation efforts centred on sustainable land and water management, alongside improvements in warning and monitoring systems. Libyan environmental policies have failed due to the worsening political and security conditions in the country. Moreover, the absence of decentralised institutional structures has led to poor governance mechanisms, characterised by ineffective decision-making and coordination, widespread corruption, inadequate data collection systems, and a lack of active civil society engagement.

## Introduction

In recent years, there has been a notable increase in the frequency of sand and dust storms in Libya. In late summer 2023, the city of Suluq, south of Benghazi, was hit by a storm that covered it entirely and lasted several days. These storms are among the most significant climate challenges facing Libya, where conflict and instability have impeded the implementation of measures to mitigate the effects of these storms in various critical sectors.

This study aims to highlight the limitations of local environmental policies in effectively addressing the repercussions of climate-related challenges, particularly sand and dust storms. It is an issue that has been pushed to the background due to the fragile institutional frameworks and overall poor governance. The study is divided into three main sections: the first two sections aim to provide an overview on the impact of sand and dust storms across various sectors, and to propose potential mitigation measures, respectively. Subsequently, the third section provides a critical analysis of the difficulties that Libya faces in implementing these measures, which include limited climate data, political instability, and the absence of civil society.

## 1. Impacts of Sand and Dust Storms

Libya lies in the dustiest region of the world. The Sahara desert, as well as other arid and semi-arid land, covers around 95 percent of the total area of the country. This means that the country is prone to severe dust storms, which pose an urgent environmental threat with wide-ranging implications. Locally known as '*al-ajaj*', these dust storms are a seasonal phenomenon that typically occurs in the spring and peaks in April. They are formed by the combination of strong seasonal winds, dry soil, and desertification, lifting fine dust and sand particles into the air. These storms can carry dust across vast distances, creating long dust belts that sometimes span continents.

Zawiya, situated west of Tripoli, is one of the areas most affected by this phenomenon. Its geographic location, characterised by soil with low resistance to wind erosion, makes it especially vulnerable to these storms, as seasonal winds readily blow dust and sand into the air. Similarly, the Gulf of Sirte is also exposed to fierce sandstorms that pose significant risks to both life and property.

Between April 13 and 16, 2022, the concentration of Sahara dust in regions like Brega, Ajdabiya, and Sirte soared to levels well above the threshold of safety, with measurements exceeding 2,000 micrograms per cubic meter in Brega and Ajdabiya, and reaching over 2,500 micrograms in Sirte. The severity of the storms was captured by residents, who shared images and videos on social media, showing the limited visibility and poor air quality caused by the storm.

Climate change and pollution have significantly contributed to the environmental degradation in Libya by exacerbating the intensity and frequency of sand and dust storms, heat waves, flash floods, and fog. A report

from the Copernicus Atmosphere Monitoring Service (CAMS)<sup>1</sup> indicates that drought, desertification, and water scarcity, all intensified by climate change, have led to a rise in airborne dust. This has been compounded by the conflict and instability of the past decade. Unchecked urban expansion, overuse of water resources, deforestation, and overgrazing have all resulted in the loss of the vegetation cover. As a result, the quality of the soil has degraded, making it more susceptible to drought and fragmentation. This, in turn, worsens sand and dust storms, posing a significant threat to critical sectors like agriculture and the economy, and severely affecting the population's health and well-being, leading to a decline in public health.

Climate change and sand and dust storms lead to significant public health issues, placing more strain on healthcare systems. Airborne Sahara dust particles with a diameter of 10 micrometres or less in diameter (PM10) pollute the air and cause a higher incidence of respiratory infections, particularly affecting women, children, and the elderly. Additionally, sand and dust storms can cause traffic accidents due to the reduced visibility. The impact of dust on air quality has also been reported to adversely affect psychological health and induce physical stress, disrupting both business operations and individual productivity.<sup>2</sup>

Similarly, the agricultural sector is highly susceptible to the impacts of climate change. The negative repercussions of sand and dust storms for agriculture include crop failure, livestock death, and topsoil erosion, which all affect food security.<sup>3</sup> The gradual loss of the vegetation cover and increased stress on water resources have both led to dwindling agricultural productivity at a time when the agricultural sector's contribution to the GDP is already low.<sup>4</sup> Agricultural policies in Libya have historically failed to achieve self-sufficiency, and there is currently a heavy reliance on imports. These challenges have been more pronounced in southern Libya, because of its proximity to the Sahara desert. These areas have been hit hard by extreme weather phenomena resulting from climate change. Grazing areas in Tobruk and Shwairif have also been negatively affected by the dry climate, soil degradation, and reliance on animal feed (to replace grazing), despite its high cost.<sup>5</sup>

These challenges have weighed heavily on the Libyan economy, leading to substantial losses from disruptions in transportation and oil production due to sandstorms. Reduced visibility from sand and dust raises the risk of traffic jams and accidents, grounds flights, and causes travel delays. Although there is a lack of data on the actual economic losses caused by sand and dust storms in recent years, the aftermath of the 1994 storm saw an estimated loss of 90 million Libyan dinars in fruit, vegetable, and grain harvests over just four days.<sup>6</sup>

## 2. Approaches to Weathering Sand and Dust Storms

Various measures of sustainable land and water management can be taken to reduce the sources of dust. Establishing tree buffers can lessen wind speeds and adopting sustainable agriculture and innovative technologies can stabilise soil, curtail wind erosion, and reduce dust formation.<sup>7</sup> Programmes to restore depleted lands must also be established along with other efforts to combat desertification. Furthermore, sustainable water management practices, such as drip irrigation, are vital in preserving the vegetation cover and minimising soil vulnerability to

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1 The Copernicus Atmosphere Monitoring Service (CAMS), "Historic' Saharan Dust Episode in Western Europe - CAMS Predictions Accurate," 15 March 2022, <https://bit.ly/49eGkjt>.

2 Al-Awjila Ashur al-Qitt, "The Effects of Dust Storms and How to Prevent Them: Zawiya as a Case Study," *al-Assala* 1 (2022), <https://bit.ly/49aBd3R>.

3 United Nations Convention to Combat Desertification (UNCCD), "Sand and Dust Storms Compendium: Summary for Decision Makers," (Bonn, Germany: Secretariat of the UNCCD, 2022), <https://bit.ly/3wk9Aa0>.

4 Abdul Wahab Abu Bakr Muhammad al-Azragh, "How Libyan Agricultural Policy Failed to Achieve Food Security (1990-2015): Challenges, Causes, and Recommendations," *Libyan Journal of Agriculture* 25.3 (2020), <https://bit.ly/3updLAL>.

5 World Food Programme and Libyan Ministry of the Environment, "Report on Climate Change in Libya," analytical report, (Libya: REACH, 2022).

6 Attia el-Tantawi, "Climate Change in Libya and Desertification of Jifara Plain," PhD dissertation, (Mainz: Johannes Gutenberg University, 2005), <https://bit.ly/4bzp1eu>.

7 World Bank Group, "Sand and Dust Storms in the Middle East and North Africa (MENA) Region," report, (Washington, D.C.: World Bank Group, 2019), <https://bit.ly/3uo8E3P>.

drought and erosion. Forests should also be protected to effectively prevent the spread of sand and dust. Local studies indicate that one hectare of forest can stabilise between 35 to 70 tons of soil and dust.<sup>8</sup>

Mitigation strategies for sand and dust storms include improving flexibility and response capabilities, as well as developing infrastructure.<sup>9</sup> This can be achieved through preparedness strategies and media guidance. It is also key to establish early warning systems by using remote sensing, satellite images, national monitoring networks, and air quality monitoring stations. Additionally, improving public awareness and providing health services and support to affected communities alleviates the effects of storms when they occur.

Furthermore, international cooperation in this field is crucial in addressing the transboundary nature of sand and dust storms. Regional initiatives, frameworks, and agreements, such as the United Nations Convention to Combat Desertification (UNCCD), provide opportunities for cooperation, knowledge sharing, and capacity building to address the root causes of these storms, as well as their repercussions. Given that climate change significantly contributes to the frequency of sand and dust storms, collaborative action – informed by the Paris Agreement of 2016 – will be essential. However, Libya will need to outline its nationally determined contributions to effectively participate in these efforts.

### 3. Obstacles to Implementing Solutions

Although the Libyan governments have been aware of the environmental degradation in Libya, they have not seriously and continuously addressed it at the national level. The current environmental negligence is the result of political instability, underdeveloped environmental policies, and limited environmental funding. There have also been challenges for civil society efforts that have created significant obstacles for potential solutions.

#### Limited Climate Data

A key obstacle in addressing sand and dust storms is the significant challenge posed by inadequate climate data, particularly the absence of monitoring and early warning systems.<sup>10</sup> This deficiency impedes the ability of national organisations, researchers, and decision-makers to devise and implement effective national strategies or conduct in-depth studies to mitigate the storms' impact. Experts<sup>11</sup> indicate that there is scarcity or complete lack of digital data on sand and dust storms, as well as a lack of equipment for ground-based measurement and monitoring at the National Meteorological Centre. The centre currently depends on outdated techniques based only on visibility of the horizon,<sup>12</sup> which makes it difficult to track sand and dust storms' activities. These challenges stem from limited governmental efforts to update monitoring technologies for extreme climate events, as well as the limited funding available for national institutions and research centres that specialise on addressing local environmental challenges.

#### Political Instability

Since the 1980s, the vegetation cover has been under significant threat due to various factors, such as armed conflicts, power struggles, poor past and present environmental policies, administrative corruption, a lack of institutional coordination, and limited funding.

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8 Dr. Muhammad Zeidan Said, "Environmental Indicators of Desertification in Plant Cover in the Jafara Plain," *al-Jamaei* 16 (2008), <https://bit.ly/3ux8OgX>.

9 United Nations Convention to Combat Desertification (UNCCD), "Sand and Dust Storms Compendium: Summary for Decision Makers."

10 Ali Salem Eddenjal, "Dust/Sand Storms over Libya: Spatial Distribution, Frequency, and Seasonality," WMO SDS-WAS, technical report (Tripoli, Libya: Libyan National Meteorological Center, July 2015), <https://bit.ly/3SzYfKe>.

11 Rima Ibrahim, "Libya Hit by Dust Storms and Climate Change," blog, Friedrich Ebert Stiftung in Libya, 10 February 2023, <https://bit.ly/3wkbKGE>.

12 Ali Salem Eddenjal, "Dust/Sand Storms over Libya: Spatial Distribution, Frequency and Seasonality."

Political unrest and ongoing conflicts have hindered the government's capacity to address, regulate, and implement effective strategies against sand and dust storms. Libya's first project to stabilise sand dunes took place in the 1960s; however, they were undermined by shifts in agricultural policy during the Gaddafi era, negatively impacting afforestation projects from the mid-1980s onward.<sup>13</sup> The situation worsened after the fall of the Gaddafi regime in 2011. Forests were subject to further negligence as a result of poor environmental policies and rollback of protection laws. This led to increased encroachment on forest land and exacerbated land loss amid armed conflicts.<sup>14</sup>

Between 1986 and 2010, approximately 27 percent of forest land was cleared, a figure that rose to 35 percent between 2011 and 2013. The Ministry of Agriculture has faced difficulties enforcing forest protection laws due to the widespread possession of weapons among the general population. Most of the trespassers on forest land were armed men under the age of 30 years.<sup>15</sup> The situation has improved recently due to the efforts of the agricultural police<sup>16</sup> and the creation of an environmental police<sup>17</sup> force capable of addressing trespassing issues on forest lands.

Political corruption has also undermined the capacity of environmental institutions to leverage support from international conventions. Libya's outstanding debt to treaties and conventions exceeds 1.2 million USD for 23 agreements.<sup>18</sup> However, these conventions are neither reflected in environmental policy nor state budgets, as national institutions continue to lack funding. The National Committee for Combating Desertification and Halting Desert Encroachment is one of the bodies struggling with funding problems.<sup>19</sup> It reported that state and government agency funding is insufficient for the effective implementation of the Convention to Combat Desertification.<sup>20</sup> In the wake of severe sand and dust storms in 2022, and amidst a partial drought, the Committee called on the Government of National Unity to finance its programmes, emphasising the urgent need for early warning projects and drought mitigation efforts.<sup>21</sup>

### Limited Involvement of Libyan Civil Society

Civil society plays a critical role in countering sand and dust storms and achieving positive change in Libya. It has the potential to work on several aspects of this issue, such as monitoring environmental challenges, raising awareness about the impacts of storms, lobbying for policy reform, and strengthening partnerships and cooperation to implement solutions. Nonetheless, there are many challenges that hinder its ability to carry out these activities, despite its significant readiness to confront environmental challenges.

Although there are several registered civil society organisations working on environmental issues, funding remains severely limited. Most of their activities rely on volunteer efforts, including afforestation campaigns, raising awareness, and cleaning up polluted areas.<sup>22</sup> However, the sustainability and quality of these campaigns is limited by inadequate funding, shortage of resources, and a lack of specialised experts. Experts argue that volunteer-led afforestation efforts under Libya's current climate conditions, without the support of sustainable

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13 Khalifa al-Khattabi and Muhammad al-Ashhab, *Forests in Libya: Between Past and Present* (Libya: Dar al-Kutub al-Wataniyya, Ministry of Agriculture and Livestock, 2020).

14 Osama Ali, "Mass Encroachment on Plant Cover in Libya," *al-Araby al-Jadeed*, 5 May 2022, <https://bit.ly/3YwNavS>.

15 Adnan Alsoul, "Deforestation in Jefara Plain, Libya: Socio-economic and Policy Drivers (Algarabulli District Case Study)," PhD dissertation (Bangor University, 2016), <https://bit.ly/49hPFXG>.

16 Libya Cloud News Agency, "Consolidation of the Branches of the Agricultural Police and Announcing Enforcement of its Policies," 5 March 2019, <https://bit.ly/3P004O9>.

17 Law Society of Libya, "Resolution No. 42 of 2022 on Establishing the Environmental Police," 19 January 2022, <https://bit.ly/44af02l>.

18 Annual Report of the Administrative Control Authority, 2022.

19 UNCCD, "Report from Libya," 28 February 2023, <https://bit.ly/48fv595>.

20 UNCCD, "Report from Libya," 28 February 2023, <https://bit.ly/48fv595>.

21 Libyan News Agency, "National Committee for Combatting Desertification to LAN: Libya is Experiencing a Partial Drought," 31 August 2022, <https://bit.ly/3uwlyN6>.

22 Al-Araby al-Jadeed, "Libya: Afforestation to Replace Lost Plant Cover," 8 February 2021, <https://bit.ly/3MWUlrZ>.

irrigation systems, are unlikely to succeed unless volunteers are familiar with the planting and seedling care techniques.<sup>23</sup>

Furthermore, environmental civil society organisations in Libya face broader challenges that restrict their operations. The Government of National Unity has revoked permits for organisations registered after 2011, while arbitrary laws have been passed to regulate their activities.<sup>24</sup> These measures negatively impact the organisations' legal standing and their ability to secure funding for local initiatives. They also reduce the organisations' capacities to influence decision-makers and advocate for changes in environmental policies.

## Conclusion

Libya is susceptible to extreme weather events caused by climate change. Its exceptional circumstances are the product of negligence of state institutions to environmental needs, and a lack of preparedness to address the impacts of climate change. Derna was a particularly severe case in September 2023,<sup>25</sup> when eastern Libya was struck by a major cyclone from the Mediterranean, known as Storm Daniel. The storm resulted in the collapse of two dams south of the city, causing devastating floods that led to an enormous loss of human life and property. This tragic incident highlighted the previous disregard of Libyan institutions to such risks and their vulnerability in the face of the climate crisis. It also served as an urgent, necessary warning to the possibility of other threats, such as future sand and dust storms. To mitigate these risks, the Libyan government must work to strengthen its institutional capabilities and develop adaptive policies, enhancing local expertise to better manage and respond to environmental challenges.

It will also be necessary to develop a comprehensive national strategy involving a wide array of stakeholders such as government officials, departments of natural resources, health, forestry, emergency services, and transportation, along with local communities, civil society, and regional partners. We must realise that any further delay in addressing sand and dust storms will only exacerbate the challenges and increase the costs of mitigating their effects in both the short and long term.

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23 Khalifa al-Khattabi, and Muhammad al-Ashhab, *Forests in Libya: Between Past and Present*.

24 Lawyers for Justice in Libya, "Civil Society Organizations in Libya Demand that Authorities Halt Unjust Laws and Oppression Campaigns that Target Civil Society," 6 April 2023, <https://bit.ly/3QDfiM9>.

25 Justin Rowlett, "Climate Change Played Major Role in Libya Floods," *BBC*, 19 September 2023, <https://bit.ly/3uxi3G4>



## Mediterranean Platform

Founded in 2022, and directed by Prof. Luigi Narbone, the Mediterranean Platform is a research, dialogue, and educational programme at the School of Government, Luiss Guido Carli. It offers a space for collective reflection on the opportunities and challenges of the Mediterranean region and promotes informed policymaking and advocacy at the national and transnational levels.

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