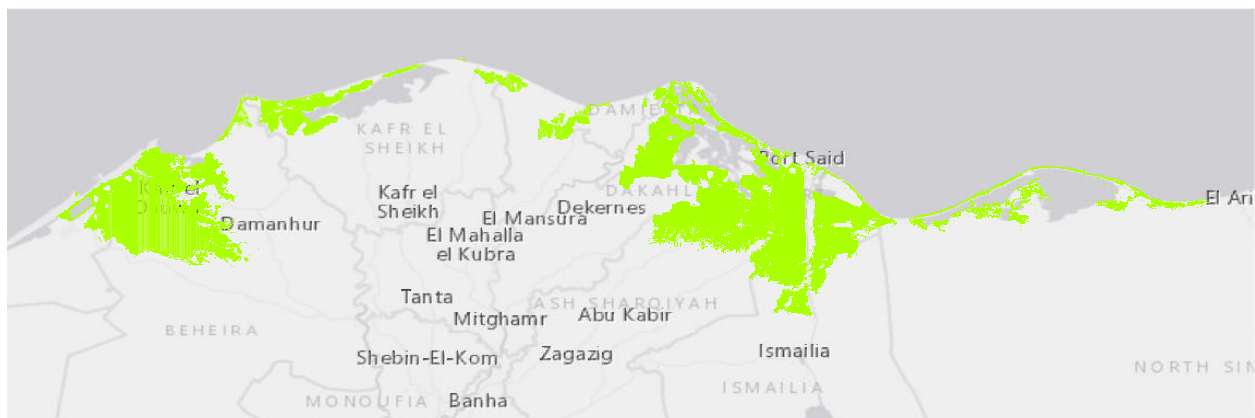


## WIM ExCom knowledge product on non-economic losses associated with climate change impacts

### Biodiversity and Territory Loss due to Sea Level Rise in Alexandria, Egypt

Alexandria, Egypt in the low-lying Nile Delta is one of the cities of the Arab region that is most exposed to the potential impacts of climate change induced sea level rise. According to a forthcoming technical paper from the Economic and Social Commission for Western Asia (ESCWA) and the Economic Commission for Latin America and the Caribbean (ECLAC) focused on the economic loss and damages associated with sea level rise (SLR) in Alexandria, sea level inundation is estimated to reach 30 centimetres along the Mediterranean Coast of Egypt (Alexandria and Port Said) between 2050-2060.<sup>1</sup> In this scenario, the land projected to be below the annual flood level is show in Figure 1.

Figure 1. Land projected to be below annual flood level due to 30 cm sea level rise (light green), Mediterranean Coast, Egypt



Source: ESCWA, forthcoming

While ESCWA and ECLAC’s study focused on costing economic loss and damage, the study presented several avenues for future research with respect to non-economic losses. While the impact of SLR on crop loss is estimated as an economic loss, a reduction in biodiversity may be a non-economic loss that may occur in the same geographic location where agriculture is practiced in the Nile delta. Further, territory and cultural assets may also be lost due to the slow onset impacts of sea level rise in the inundated areas.

A qualitative assessment reviewing literature on potential loss of biodiversity and territory due to SLR in the impact area outlined by ESCWA and ECLAC reveals several key findings with respect to non-economic losses:

- *Environmental degradation/ loss of ecosystem services*
  - SLR will have a disproportionate impact on “biophysical infrastructure” on the Nile Delta, in comparison to other Mediterranean coastal areas of Egypt. (Frihy et. al., 2013).
  - Global warming induced SLR will impact the “biodiversity of marine, freshwater and terrestrial ecosystems” in the low-lying land of the Nile delta (Khalil et. al., 2022).

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<sup>1</sup> This estimate is based on the current IPCC leading consensus scenario (SSP3-7.0). (ESCWA and ECLAC Study, Forthcoming), “Estimating the Economic Losses to Transportation, Housing and Agriculture due to Sea Level Rise: A Case Study in Alexandria, Egypt.” ECLAC and ESCWA.

- SRL will impact water quality and freshwater fish in the affected reaches of the Nile River (Khalil et. al., 2022).
- Saltwater intrusion caused by SLR can lead to the “disappearance of freshwater biota and deterioration of wetland diversity” (Khalil et. al., 2022).
- *Loss of territory and related losses*
  - SLR will also impact human settlements and may lead to displacement (Khalil et. al., 2022).
  - Seawater flooding impacts farmlands in the Nile delta, impacting both the inhabitants there and their source of livelihood (Mikaelian, 2022).

Several policy and technological solutions are proposed to potentially limit non-economic losses due to SLR in Alexandria and the surrounding area. In fall 2023, ESCWA and the government of Sweden launched a new Multi-Stakeholder Platform for Protecting Biodiversity. The main objective of the platform is to facilitate collaboration and coordination among relevant stakeholders involved in biodiversity conservation in the Arab region, including through the development of bankable projects to mobilize finance for biodiversity conservation and climate resilience. The platform and its working group members are currently working on preparing concept notes and project proposals around nature-based solutions (NBS) for climate resilience. This may include NBS to limit the impact of SLR on biodiversity and territory loss in the Nile delta.

UNDP has also been working on developing NBS to confront SLR in Egypt through a project funded by the Global Environmental Facility, “Adaptation to Climate Change in the Nile Delta through Integrated Coastal Zone Management.” Based on local knowledge and practice concerning the use of reed fencing to encourage the development of sand dunes and reduce flood impacts, the UNDP has been developing prototypes for NBS inspired dike structures, including sand fence and clay core dikes. Such a solution could respond to non-economic losses arising from SLR impacts on the loss of territory and displacement in the Nile delta (Mikaelian, 2022).

Going forward, access to sufficient climate finance will play a crucial role in being able to scale NBS to combat SLR’s exacerbating impacts on non-economic losses. ESCWA’s biodiversity platform can play a role in mobilizing finance to address the impact of SLR on biodiversity loss in Alexandria and the Nile delta, in particular as a priority hotspot in the Arab region.

Building on ESCWA and ECLAC’s forthcoming publication for estimating the economic loss associated with SLR on the farming, transportation and housing sectors in Alexandria, a follow up study could also be completed using environmental scoring and/or interviews with key stakeholders, including vulnerable communities, to provide a narrative description of the non-economic losses, in addition to estimated economic costs for the selected sectors.<sup>2</sup>

### *Sources*

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<sup>2</sup> UNFCCC. 9 October 2023. Non-economic losses in the context of the work programme on loss and damage. <https://unfccc.int/resource/docs/2013/tp/02.pdf> Accessed 26 January 2024.

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