

Translated from Arabic

**Kingdom of Bahrain
Supreme Council for the Environment**

The impact of sea level rise on the Kingdom of Bahrain

Sea level rise is one of the main and undeniable effects of climate change. As in all small island developing States, sea level rise in Bahrain poses a threat to the coasts of the six main islands, and the majority of the Kingdom’s population and infrastructure is located along those coasts. Population density is currently high in coastal areas that are 5 m or less above sea level.

The aim of the vulnerability assessment of coastal areas is to determine and measure the extent of seawater inundation, depending on land use and location, and address a range of sea level rise scenarios for 2050 and 2100. The study covers the entire land area, from the coast to interior areas the elevation of which is 5 m above sea level, and seven different regions, namely, northern and southern Bahrain, Muharraq, Sitrah, Nabi Saleh, Umm al-Na’san and the Hawar Islands. A three-part methodology, which included gathering and processing data and modelling seawater inundation, was used.

Figure 1

Left: Total sensitive land area in Bahrain under various sea level rise scenarios.
Right: critical land area, by elevation and island, that is 5 m or less above mean sea level.

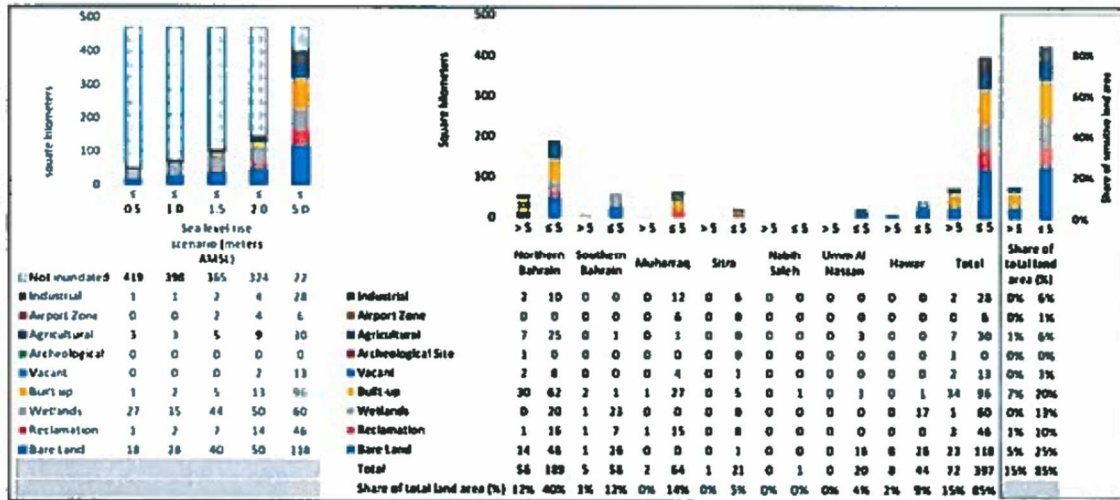


Figure 1 shows the extent to which seawater would inundate Bahrain under various scenarios. The results confirm that Bahrain is highly vulnerable to a rise in sea level, and that even a small rise in sea level would result in the inundation of certain types of land. Following are some of the main impacts: wetlands would be subject to significant inundation; approximately 27 km², or half of all wetlands, would be submerged if the sea level were to rise by 0.5 m, while three quarters of all wetlands would be submerged if the sea level were to rise by up to 1.5 m.

- Some 50 km² of reclaimed land would be affected by a small rise in sea level: approximately 2 per cent (1 km²) would be submerged if the sea level were to rise 0.5 m, and approximately 30 per cent (14 km²) if the sea level were to rise 2 m.
- Built-up areas are among the best suited to withstand sea level rise. Less than 2 per cent (2 km²) would be submerged if the level were to rise no more than 1 m, and only 10 per cent (13 km²) would be submerged if the level were to rise no more than 2 m.

- Industrial zones are more vulnerable to sea level rise than built-up areas. Approximately 15 per cent (4 km²) of such land would be submerged if the sea level were to rise 2 m, and less than 3 per cent (1 km²) if it were to rise no more than 1 m.
- All types of land would be severely affected if the sea level were to rise 5 m. The Airport of the Kingdom of Bahrain would be completely inundated, while wetlands, reclaimed areas and industrial areas would lose at least 94 per cent of their total area. Built-up areas would lose approximately 74 per cent of their total area. Of the total critical land area, which measures 470 km², only 72 km² (15 per cent) would be submerged, because its elevation is more than 5 m above sea level.

Climate change will exacerbate the currently unsustainable supply of and demand for water. Sea level rise may cause seawater to intrude into aquifers and could affect the intake and discharge canals of water desalination plants. Low rainfall rates will also reduce groundwater recharge rates, and rising temperatures will increase the demand for groundwater in the agricultural, domestic and commercial sectors and intensify the currently unsustainable use of groundwater by those sectors. The main challenge for water management is how to strike a balance between shrinking supplies and increased demand for water in the context of climate change.

Integrating, as quickly as possible, adaption to sea level rise into local policymaking is vital to countering the effects thereof. Protection is the only option for long-term adaptation in the Kingdom. Increased capacity, integrated planning, local/regional stakeholder engagement and coastal protection are among the key principles set out in the climate change adaptation plan with respect to protecting coastal and residential areas.

National climate change adaptation initiatives, in particular adaptation to sea level rise

In 2016, Bahrain promulgated Decision No. 28 (2006) concerning the establishment and composition of the National Disaster Response Committee, the mandate of which includes proposing detailed plans and programmes for responding to and mitigating the effects of disasters efficiently and effectively, including climate change-related disasters. The Committee has contributed effectively to the development of a national disaster management plan that is consistent with the Sendai Framework for Disaster Risk Reduction, the purpose of which is to build capacity to respond to crises and disasters, including climate change disasters.

In 2009, Bahrain promulgated Decision No. 28 (2009) on the regulatory requirements for construction throughout the Kingdom of Bahrain. As an initial measure of adaptation to sea level rise, the Decision provides that the ground floor of new buildings shall be 1.5 m above the level of the pavement.

In 2014, Bahrain launched the mangrove planting project. The council [*sic*] has begun carrying out a number of activities related to the planting of mangroves in several locations, including in Tubli Bay, Ma'amir Canal, Dawhat Arad, Ra's Sanad Reserve and Bapco corporation. Mangroves are one of the primary lines of defence for coasts, as they help to protect them against and adapt to the effects of climate change.
