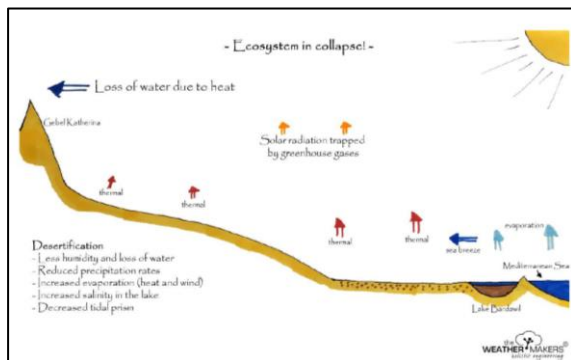


Ecological restoration in the Sinai

Weather Makers is a group of international engineers and scientists. For the past three years, they have been working on a restoration project in the Sinai Peninsula (Egypt) involving ecological regeneration through the creation of a robust water cycle in the region. The holistic multidisciplinary project has the potential to restore a declining aquatic ecosystem on the Mediterranean coast and address the problem of desertification.

The diagram below shows the geographical setting, with the Mediterranean Sea and Lake Bardawil to the north and the desert and Gebel Katharina to the south.

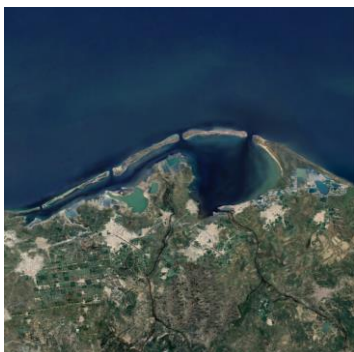


The project involves five stages:

Stage 1: restoring Lake Bardawil

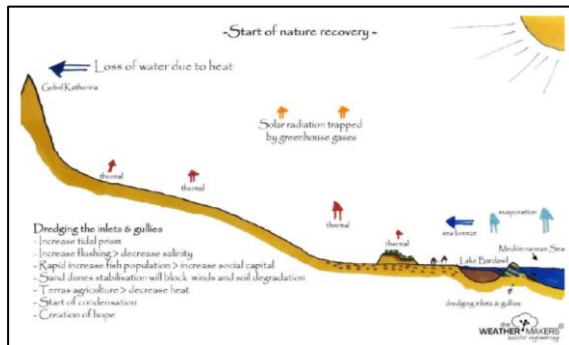
Lake Bardawil is a shallow lagoon on the northern coast of the Sinai connected to the Mediterranean Sea by two inlets. The inlets of the lake are subject to sedimentation resulting in limited seawater exchange. The lake was once 40 metres deep but is now approximately 1.5 metres deep. The shallowness of the lake results in high evaporation rates. In combination with little freshwater input, this causes the salt levels of the water to become extremely high.

Lake Bardawil, Sinai, Egypt



Traditionally, the lake has had an important fishing industry, a vital source of income for the local community. The deterioration of the lake together with overfishing has depleted fish stocks.

Restoration of Lake Bardawil is possible by dredging and deepening the inlets to increase water exchange with the Mediterranean Sea. As fish stocks increase, sustainable fishing strategies should ensure its long-term survival. The ecosystem should fully recover and thousands of jobs could be created.



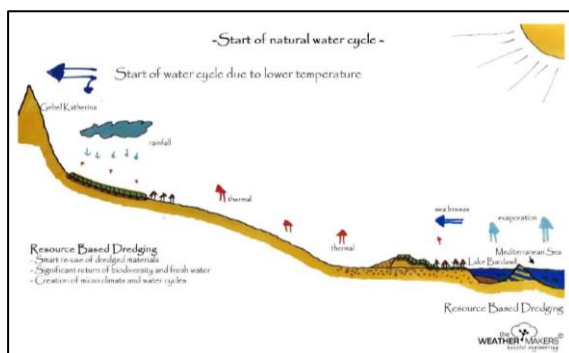
Stage 2: restoring the wetlands

Restoring the historical wetlands in and around Lake Bardawil will make the marine ecosystem and related social-economic dependencies more robust. By restoring the lake and replanting salt-tolerant plants, the whole marine ecosystem will benefit, strengthening its position as a stopover for migrating birds.

Stage 3: reusing marine sediments

For hundreds of years, marine sediments such as sand, silts, clay and peat have accumulated in Lake Bardawil. These sediments can be reused in many different ways. Once desalinated, materials with a high organic content can provide fertile soils whereas more cohesive clay-rich sediments can be used for structural works such as dams and terraces to reduce permeability. Granular (sand-rich) materials can be reused for construction works, such as coastal reinforcement.

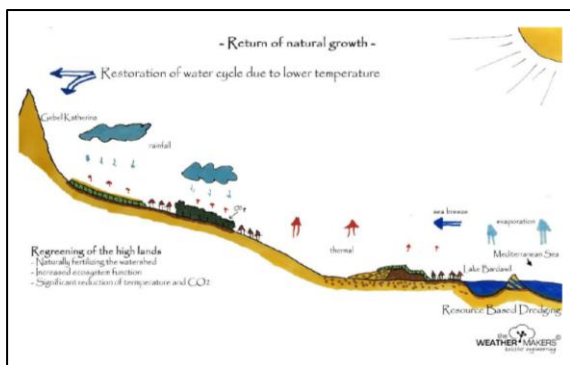
As the diagram below shows, these measures will gradually increase moisture generation and exchange promoting a more vigorous water cycle. With more evapotranspiration at the coast, sea breezes will encourage a southerly transfer of moist air over the desert triggering relief rainfall as air rises in contact with the mountains. This will enable vegetation to grow in the form of trees and crops.



Stage 4: re-greening the desert

The current population of the Sinai is estimated to be around half a million in Northern Sinai with the highest number of inhabitants living in the El Arish city area. The local people suffer from poverty, terrorism and natural hazards such as sand storms and flash floods. Successful re-greening of the Sinai promises to bring a much better life for the people in the Sinai.

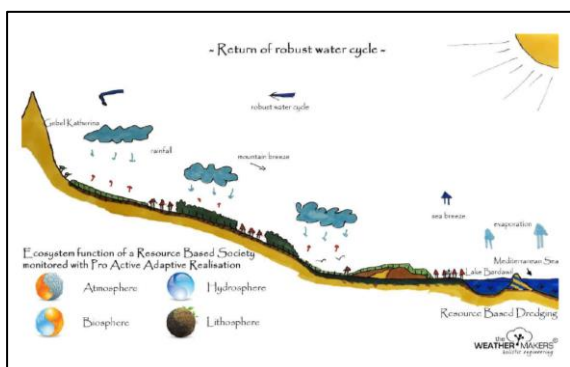
Re-greening the desert in a sustainable manner is extremely challenging but feasible. It could involve a variety of measures such as the use of organic material to help retain soil moisture and the use of fog nets at high altitudes to capture and collect moisture direct from the air. A system of dykes and dams using clay construction materials from the lake can be used to store and transfer water. Increased water management in the uplands will also mitigate flash flooding in El Arish city.



Re-greening provides options for growing vegetables, grazing animals, agro-forestry and the introduction of household garden concepts all of which can benefit local communities.

Stage 5: restoring the watershed

Restoring the natural water cycle of the northern watershed between Gebel Katharina and Lake Bardawil is essential to guarantee a sustainable future for Sinai communities. By increasing rates of evapotranspiration in the lowlands, harvesting water in the highlands and re-greening the desert, levels of atmospheric moisture will increase, temperatures will be moderated and the water cycle will become more robust.



(Based on <https://www.greenth Sinai.com/> , edited by Simon Ross with additional illustrations from Maarten Lanter]