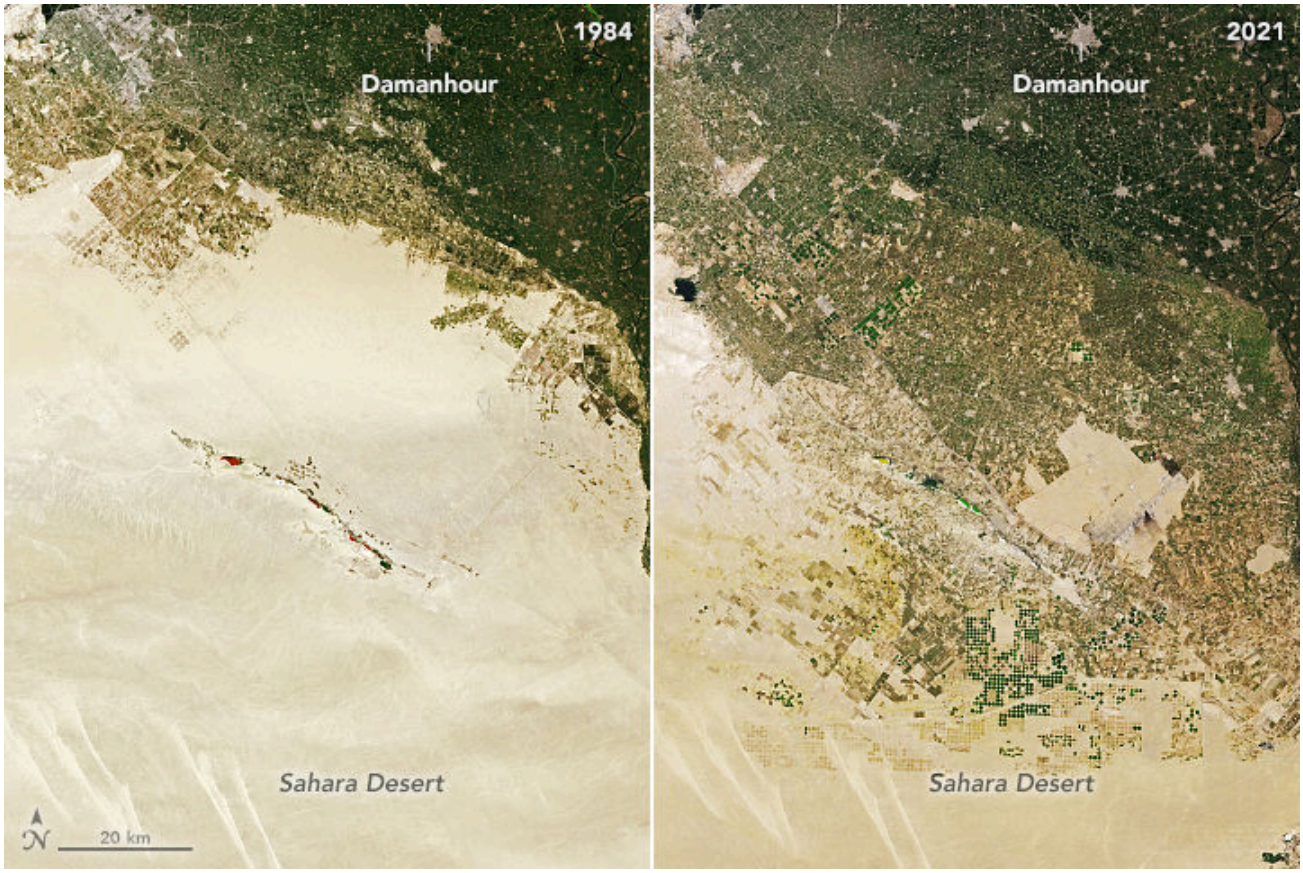
IF THE WORLD HAD LISTENED

A Tale of Two Futures for Al Beheira, Egypt's Fertile North



These two NASA Landsat images show the same stretch of land near Damanhour, Al Beheira, photographed 37 years apart. In 1984 (left), the boundary between Egypt's cultivated delta and the Sahara Desert was stark and fixed: dark green farmland to the north, pale sand to the south. By 2021 (right), that boundary has blurred and shifted. A patchwork of new green squares, irrigated plots carved out of desert land, has spread southward, as Egypt has pushed agricultural expansion deeper into arid terrain to compensate for losses elsewhere. The image is not a story of abundance. It is a story of pressure: farmland in the north is being degraded by salt and sea-level rise faster than new land can be reclaimed from the desert. The green is moving in the wrong direction.

The Nile Delta, Egypt -as seen from space.- *Credit: NASA Visible Earth / Landsat - U.S. Geological Survey. Public domain.*

PROLOGUE: THE LAND THAT BUILT EGYPT

Al Beheira Governorate, 10,000 km^2 of Nile Delta farmland in Egypt's fertile north, has fed civilizations for millennia. Its cotton, rice, maize, and wheat fields are pillars of national food security. Today, that land is under siege from rising seas, salt, and heat, a crisis it did not cause and cannot alone survive **(IPCC AR4, 2007)**.

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AL BEHEIRA TODAY: SALT, HEAT, AND LOSS

The Mediterranean Sea has been rising at 3.2 mm per year since 2012, pushing saltwater into the aquifers beneath Al Beheira's farmland. Soil salinity has increased 20% over four decades, degrading fertility and contaminating freshwater reserves. Most northern districts are now classified as highly sensitive to climate change **(AUC Research, 2024; Ganzour et al., Egypt Journal of Soil Science, 2024)**.



Farmland around Alexandria, 2021. Green indicates active cultivation; grey marks urban encroachment. The pale mottled zones along the northern fringe are where saltwater intrusion and soil salinisation have degraded agricultural land, damage now affecting 15% of Egypt's most fertile delta soils. *Credit: NASA Earth Observatory / USGS Landsat, public domain*

Cotton fields that once produced Egypt's legendary long-staple fibre now yield thin, stunted plants on crusted soil. Rice water-use efficiency will fall significantly by 2050 under all modeled scenarios **(Springer Water Science, 2025)**. Wheat yields in the delta have dropped 15% in a decade from heat and salinity stress **(AUC Research, 2024)**. Climate change has reduced African agricultural productivity by 30-33%cumulatively **(IPCC AR6, WG2, Ch.5)**.

As yields collapse, farming families are migrating to cities, dissolving agricultural knowledge and community bonds built over generations **(Baker Institute, 2024)**. **The farmers' children are poorer**

than the farmers were. And the farmers are poorer than their parents were (ScienceDirect, 2024).

KEY MESSAGES

- 20% increase in soil salinity over 40 years (AUC Research, 2024)
- 15% decline in delta crop yields in one decade (AUC Research, 2024)
- Sea level is rising 3.2 mm/year, contaminating groundwater (Muwatin, 2024)
- African agricultural productivity down 30-33% due to climate change (IPCC AR6, WG2)
- Coastal farmers abandoning land and migrating to cities (Baker Institute, 2024)

"Climate change has become a clear reality in the Delta. We are paying the price for it daily, even though we are not the ones causing it."

Prof. Ayman El-Gamal, former Director, Coastal Research Institute, Alexandria (Earth Journalism Network, 2024)



Salt-crusted soil. Source: Ministry of Agriculture and Land Reclamation, Agricultural Extension Sector.

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PART TWO: THE WORLD THAT COULD HAVE BEEN

IF THE WORLD HAD ACTED IN 1992: THE IPCC SSP1-1.9 SCENARIO

What follows is grounded in the IPCC's **SSP1-1.9 scenario**, the pathway corresponding to a **1.5°C warming ceiling**, describing the Al Beheira that could have existed today had emissions peaked by 2000, beginning with genuine political commitment at Rio in 1992.

Chapter One: The Morning After Rio

Imagine a different 1992. The heads of state in Rio go home and mean it. The major industrialized nations begin a genuine, managed transition away from coal and oil. By 2050, net zero is not a slogan. It is a fact. The IPCC calls this world SSP1-1.9, where global temperatures in 2025 sit at **1.2 to 1.3°C** above pre-industrial levels, not the 1.5 to 1.6°C already recorded in our actual timeline **(IPCC AR6, WGI SPM, 2021)**. That 0.3°C difference sounds modest. On a planet, it is the difference between two worlds.

Chapter Two: The Soil That Was Saved

Walk into a cotton field in northern Al Beheira in the year 2025. The soil is dark and moist. There is no white crust. The sea has risen 2-4 cm less than in our timeline, and that difference, compounded across a low-lying delta, means the saltwater front has not reached the heartland. Globally, cropland becoming unsuitable stays below 8% rather than over 30% **(IPCC AR6, WG2, Ch.5, 2022)**. The fields at the Governorate's core remain viable.



Credit: Photo by Yılmaz Burak Sakarya: https://www.pexels.com/photo/close-up-of-rich-soil-texture-for-gardening-29555030/

Chapter Three: Um Hassan's Cotton

Um Hassan still grows cotton in Rashid, the way her mother taught her, reading the soil with bare feet. Her yield is not abundant. But it has not broken. She earns three times what her real-2025 counterpart

earns, because the global markets are less disrupted by simultaneous climate shocks **(IPCC AR6, WG2, Ch.5, 2022)**. *Her daughter has not left for Cairo. There was no reason to leave. The land still works.*



Cotton Field in Bloom https://www.flickr.com/photos/184594136@N08/52309207039/

Chapter Four: The Coastline Protected, Not Just Defended

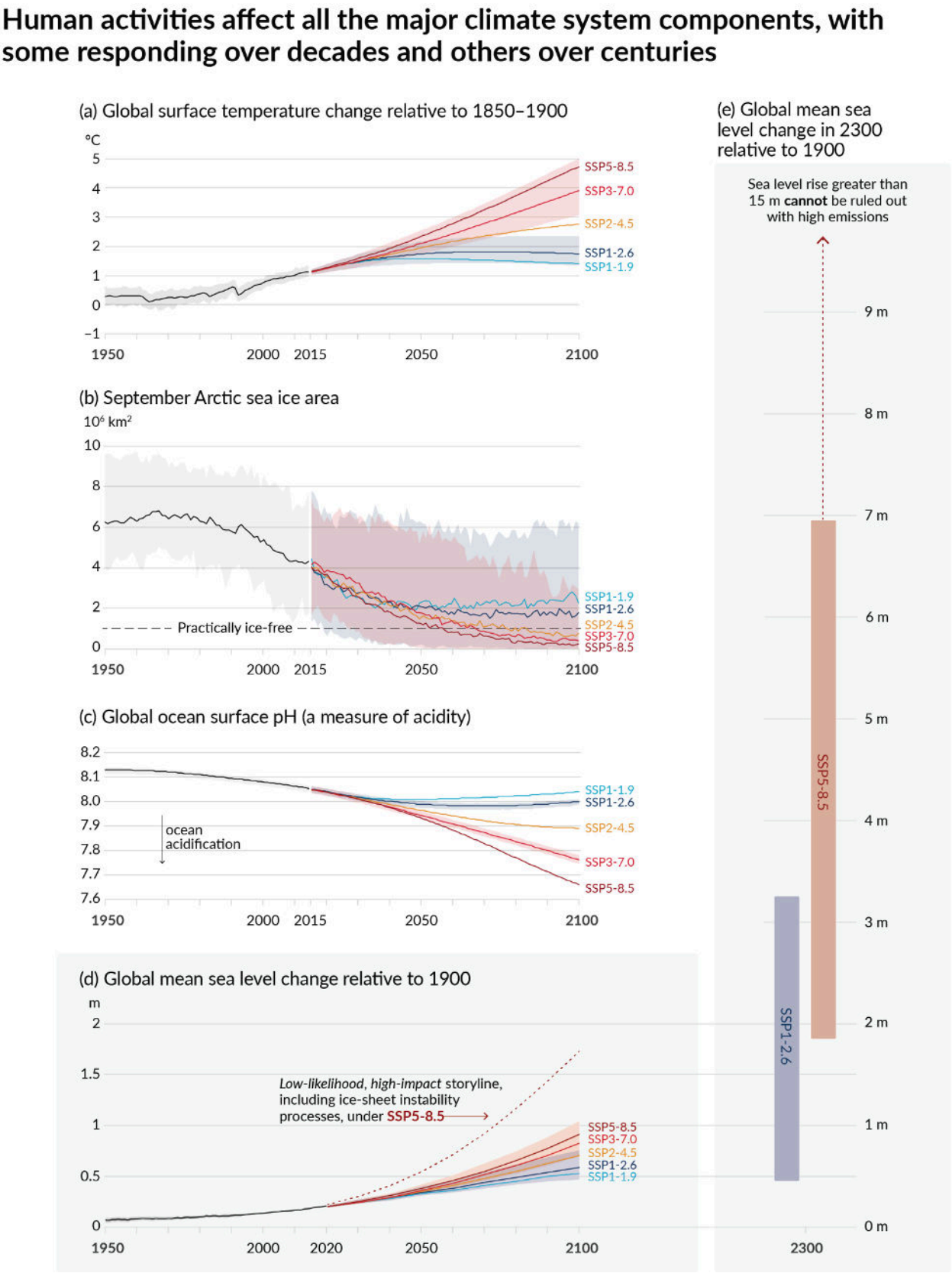
In real 2025, Egypt spends US$31.5 million on emergency sand walls. In the world of SSP1-1.9, those walls are precaution, not emergency. The money saved is invested in early warning systems, salt-tolerant crops, and drainage networks that give farmers time to adapt before catastrophe strikes **(Carnegie Endowment for International Peace, 2023)**.



Chapter Five: The Children Who Stayed

The young people of Al Beheira look at their parents' fields and see a future. Loss and damage still exist in this world, but on a scale that communities can absorb. The IPCC is clear: risks to food security rise from moderate to high between 1.5°C and 2°C of warming. In the world that listened, Al Beheira sits at 1.5°C. In ours, it is already beyond that threshold and climbing **(IPCC AR6, WG2, Ch.5, 2022)**. That is the boundary between a community under pressure and **a community losing its future.**

IPCC AR6 Figure SPM. 8 shows projected global surface temperature change under five shared socioeconomic pathways (SSPs), the range of possible futures depending on how quickly the world cuts emissions. The x-axis tracks time from 1950 to 2100. The y-axis shows temperature rise above pre-industrial levels in degrees Celsius. Each colored band represents a different scenario: SSP1-1.9 (green, bottom) is the world of this document, where emissions peak immediately and stabilize near 1.5°C. SSP5-8.5 (red, top) is the high-emissions "business as usual" path, where temperatures could exceed 4°C by 2100. The shaded bands around each line show the range of uncertainty across climate models. The vertical gray bar marks approximately where we are today, already above 1.5°C in our actual timeline, on the wrong side of the threshold Al Beheira needs to survive.



IPCC AR6 SPM Figure SPM.8: SSP warming pathway comparison (open access).

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EPILOGUE

The people of Al Beheira did not make the choices that warmed the planet. They are living with consequences decided in boardrooms and parliaments on the other side of the world, by people who have never stood in a Beheira cotton field and watched the white salt crust rise through the soil. *This is what loss and damage means: someone else's choice became your loss.* Measured in salinized fields. In abandoned villages. In children who will never learn to read their ancestral soil because the soil is no longer legible.

The fairytale of the world that listened still exists, in the IPCC's models, in the Paris Agreement's text. But every year of delay makes the gap harder to close, and the losses already inflicted on Al Beheira more permanent. **The sea does not care about deadlines. The salt does not wait for consensus.**

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RECOMMENDATIONS

1. Strengthen agricultural adaptation policies: Accelerate salt-tolerant crop programs, improved drainage, and soil remediation across Egypt's northern delta, integrated into national agricultural planning.

2. Deploy climate-smart support to farmers: Restore agricultural extension services and early warning systems to coastal communities in Al Beheira. Farmer-level technical support is currently absent and urgently needed.

3. Operationalize the Loss and Damage Fund: Al Beheira's crisis stems from emissions produced elsewhere. The COP27 Loss and Damage Fund must be made accessible to affected delta communities with direct, adequate, and timely financing.

4. Accelerate global fossil fuel phase-out: The most effective long-term adaptation for the Nile Delta is rapid global decarbonization. Every additional degree of warming narrows the window between pressure and permanent loss.

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