



Food and Agriculture
Organization of the
United Nations



General Fisheries
Commission for
the Mediterranean

Impact of Climate Change on Aquaculture Case Studies

GFCM CAQ
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Introduction

- Climate change is significantly impacting aquaculture in the Mediterranean and the Black Sea.
- Rising temperatures and extreme weather events are increasing disease and mortality risks.
- Case studies from Tunisia, Croatia, and Cyprus illustrate the challenges and adaptation strategies.



Global average annual temperature (IPCC):

Preindustrial average: 13.7°C

2024: 14.9°C

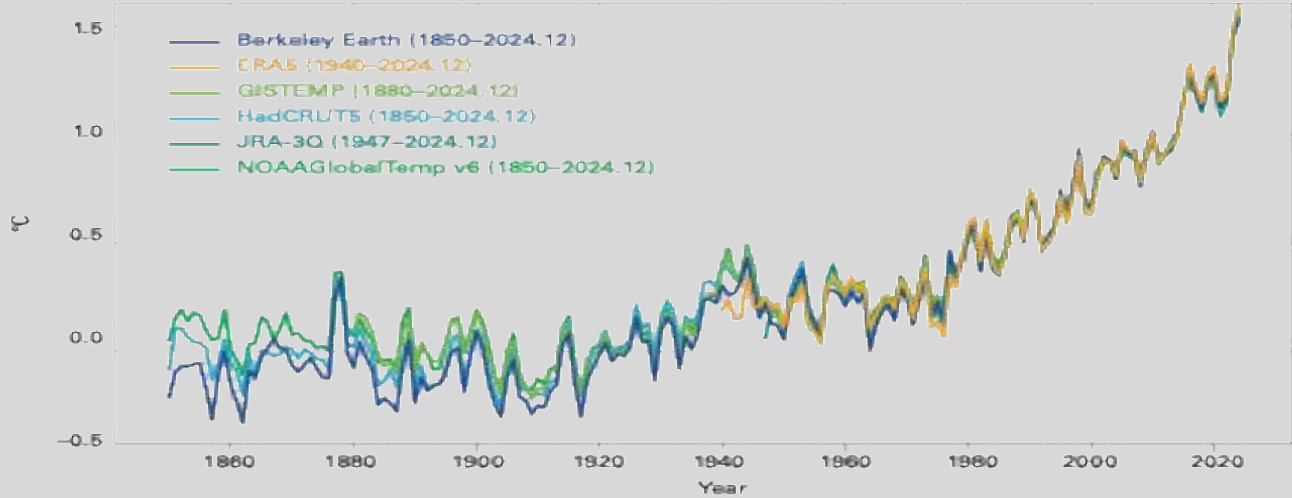
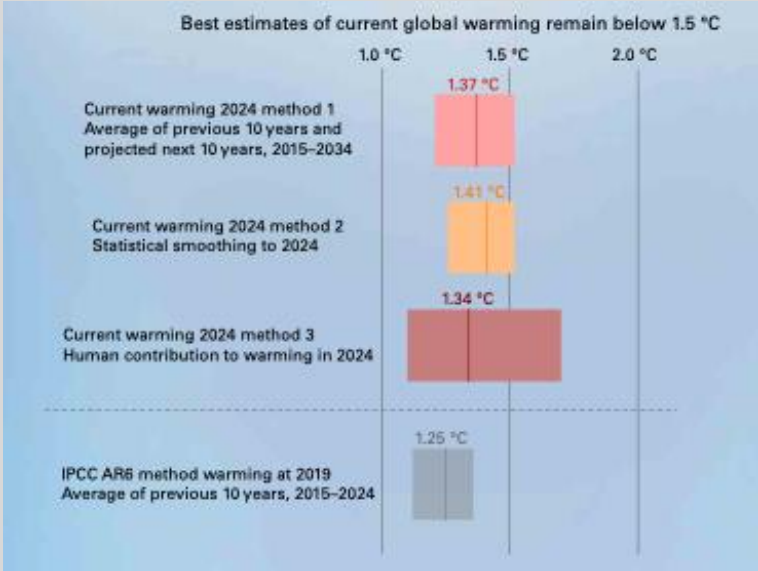
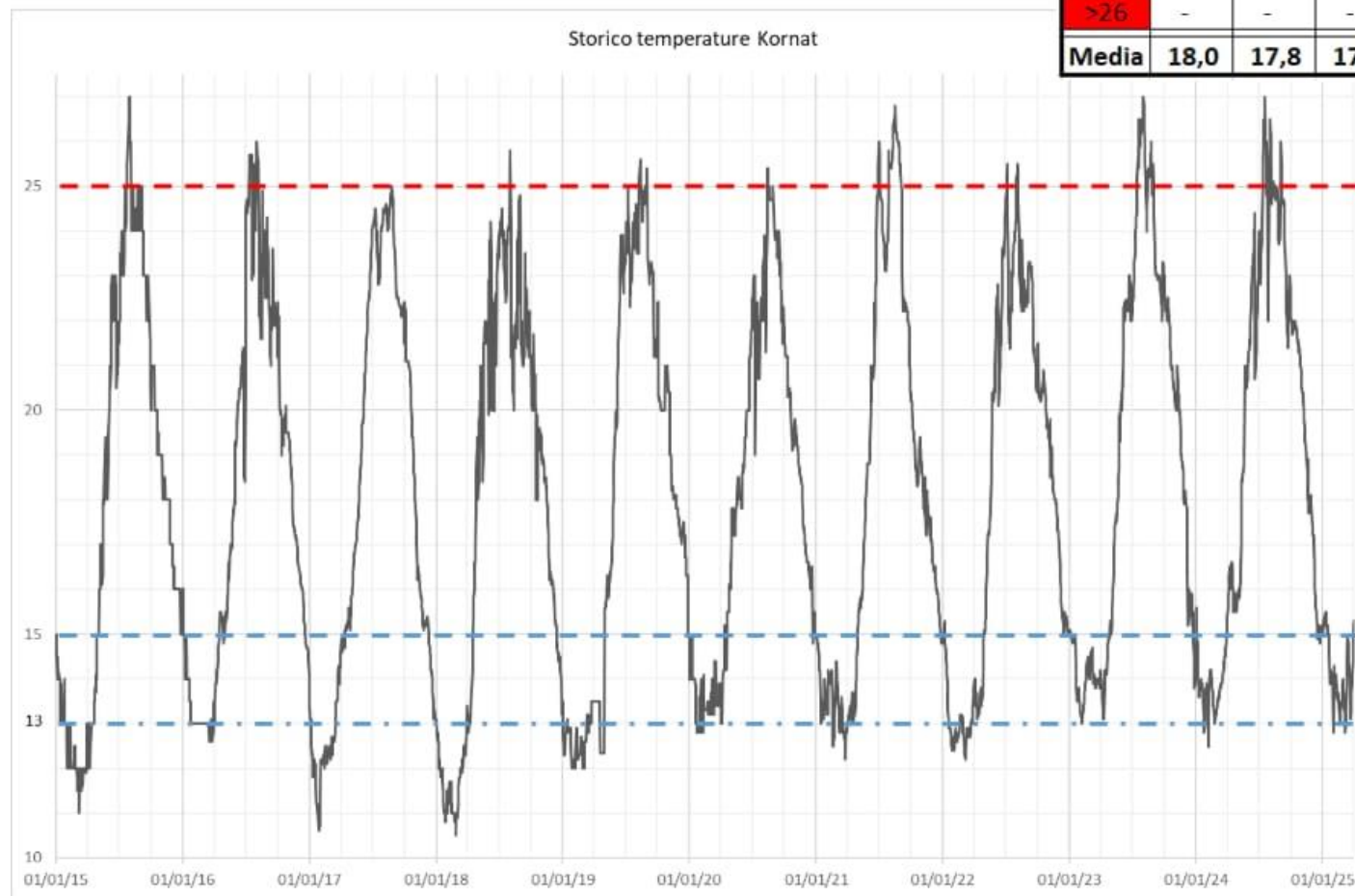


Figure 2. Annual global mean temperature anomalies relative to a pre-industrial (1850–1900) baseline shown from 1850 to 2024
Source: Data are from the six datasets indicated in the legend. For details see [Datasets and methods](#).



°C	2016	2017	2018	2019	2020	2021	2022	2023	2024
<15	121	125	124	124	114	126	121	122	99
15-23	192	173	195	157	206	165	198	178	183
23-26	52	67	46	84	45	62	46	50	77
>26	-	-	-	-	-	12	-	15	6
Media	18,0	17,8	17,8	18,1	18,1	18,2	18,1	18,9	19,0

**2015 – 2025
Adriatic Sea surface
temperatures in
Zadar**



Croatia

Tunisia

Cyprus



Case Study: Tunisia

Challenges:

- 95% decline in shellfish farming in Bizerte Lagoon due to high temperatures.
- Possible invasive blue crab impact on shellfish production.
- Fish predation and algal blooms affecting production.

Solutions:

- Shift to oyster (*Crassostrea gigas*) and red algae (*Gracilaria* spp.) farming.
- Displacement of farming operations to deeper waters.
- Support from national administration for adaptation measures.



Case Study: Cyprus

Challenges:

- Rising sea temperatures (although lower than other areas) prolong high-temperature periods.
- Increased disease outbreaks (Vibrio, VNN, Pasteurella).
- More rare but stronger extreme weather events impacting infrastructure.

Solutions:

- Mandatory biosecurity plans for all farms.
- Changes in fish density, feed and feeding regimes modifications.
- National vaccination program and EMFAF funding support.



Case Study: Croatia

Challenges:

- Rising mortality rates in Mediterranean sea bass.
- Mussel mortality due to high temperatures.
- Increased predation on bivalves.

Solutions:

- Farming relocation to deeper waters.
- Genetic selection for heat-resistant species.
- Improved farm infrastructure, mortality management and biosecurity.



Key Takeaways and Recommendations

Marine heatwaves have tripled in frequency and last 50% longer compared to the 1980s, intensifying fish stress and disease susceptibility

Rising temperatures accelerate pathogen replication, leading to increased outbreaks of bacterial infections such as *Vibrio* and *Photobacterium*

Offshore aquaculture relocation and deeper cage positioning help mitigate extreme temperature effects but require significant investment

Climate adaptation requires policy support and funding.

Investment in new species, selective breeding, biosecurity, and climate-corrected feed is crucial.

Collaboration between farmers, researchers, and policymakers on national and regional levels enhances resilience.

Regional monitoring and disease surveillance must be improved.

An underwater photograph of a coral reef. In the center, there is a large, vertical, brownish structure, possibly a piece of coral or a man-made object. The reef is covered in various types of coral, including branching and table corals. The water is clear and blue. The text "Thank you!" is overlaid in white in the upper left quadrant.

Thank you!

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