Trees with extreme climate challenges

Progress report from SAUDI ARABIA

Dorella Pinter Burus

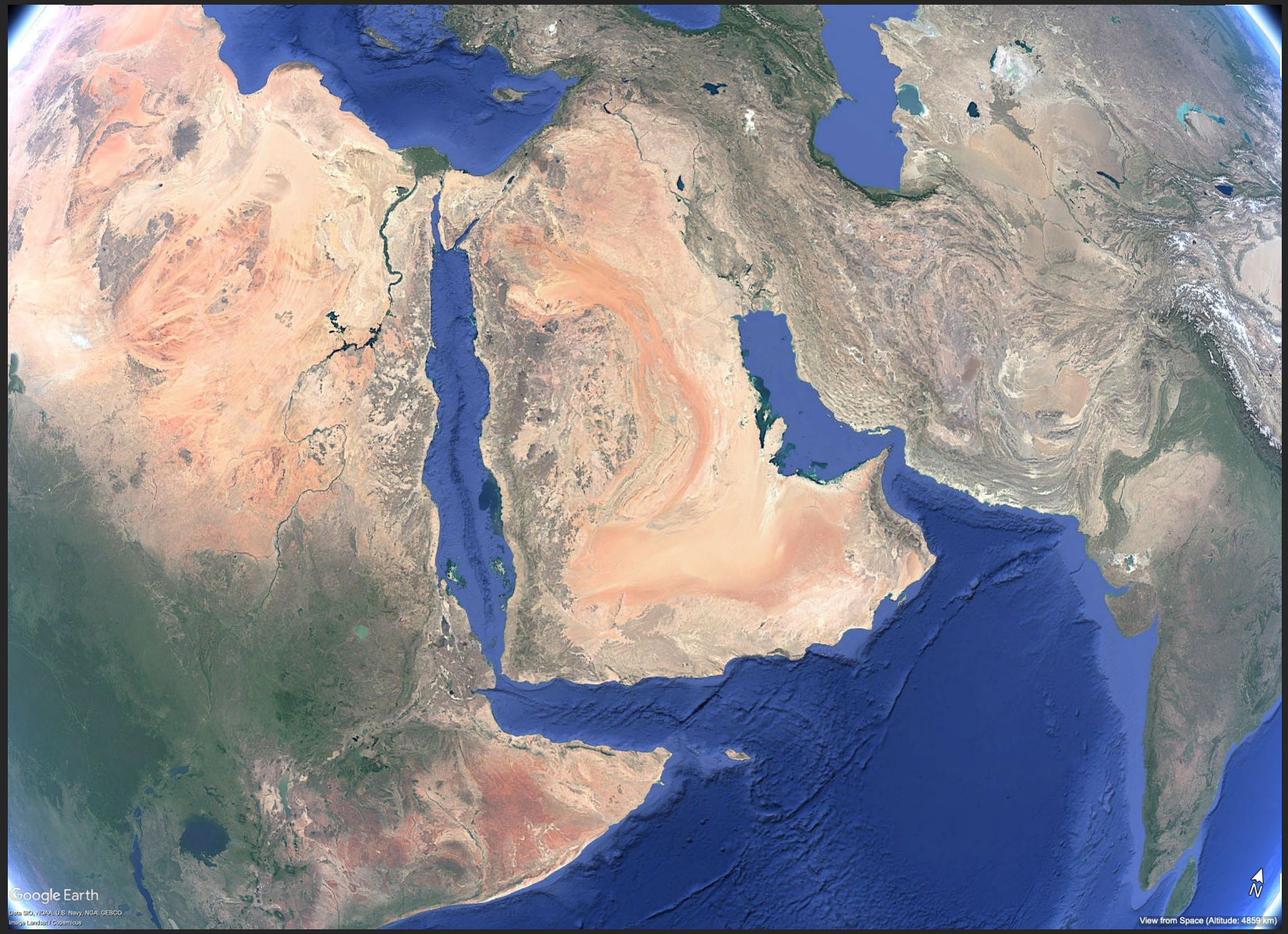
August 2026







Saudi Arabia, a country of the extremes



Saudi Arabia around 2050



HEAT

+37.4 to 38.7°C

Projected annual warming by 2041–2050 vs 2008–2017

EXTREME HEAT

0.3 → 4.4 days

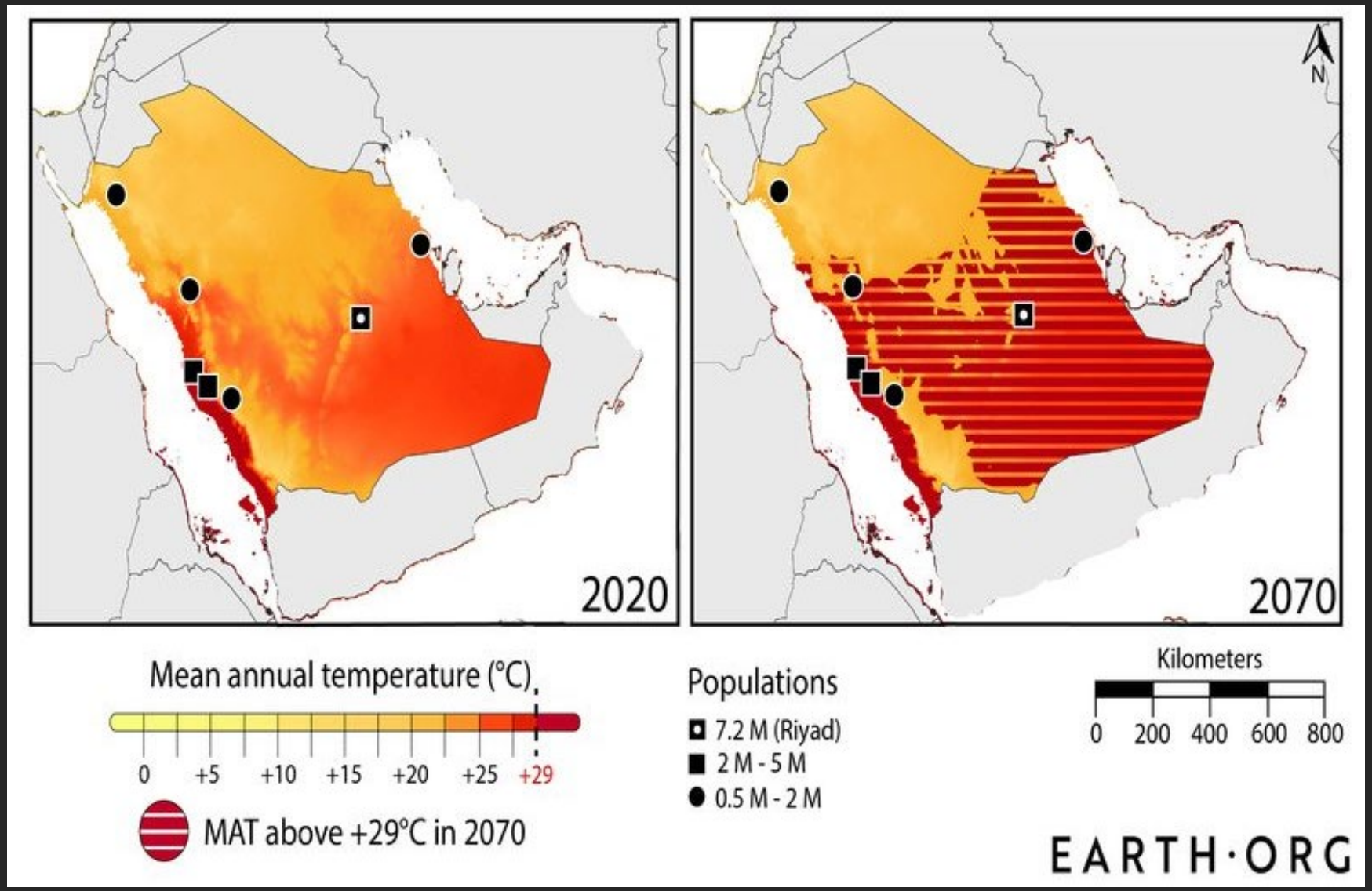
Atmospheric water demand is projected
to rise faster than rainfall

EXTREME RAIN

20.1 → 29.6 mm/day*

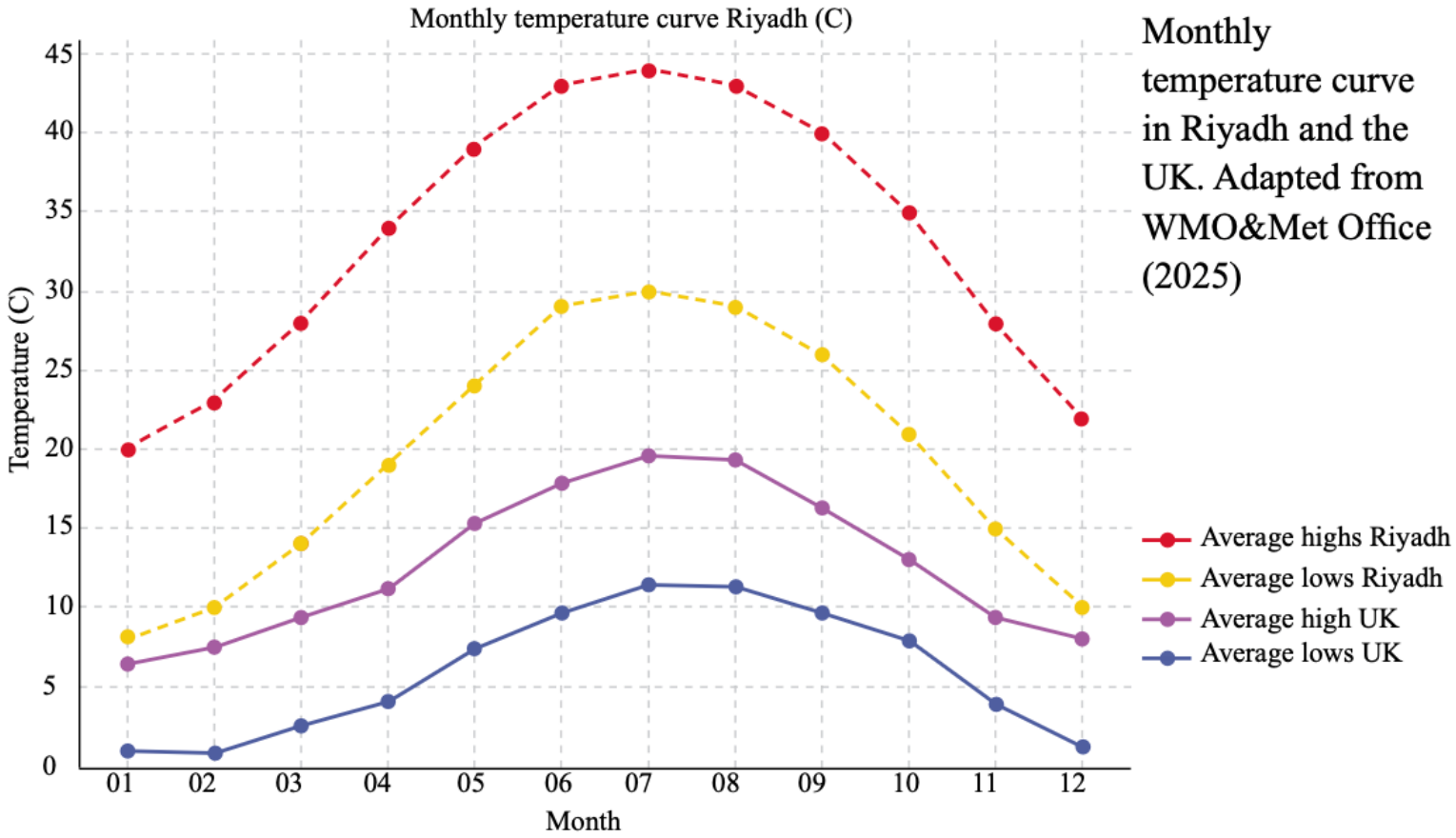
*November projections
(Rainfall projections are more uncertain)

…and where it is heading



The driest city…Riyadh

Temperature

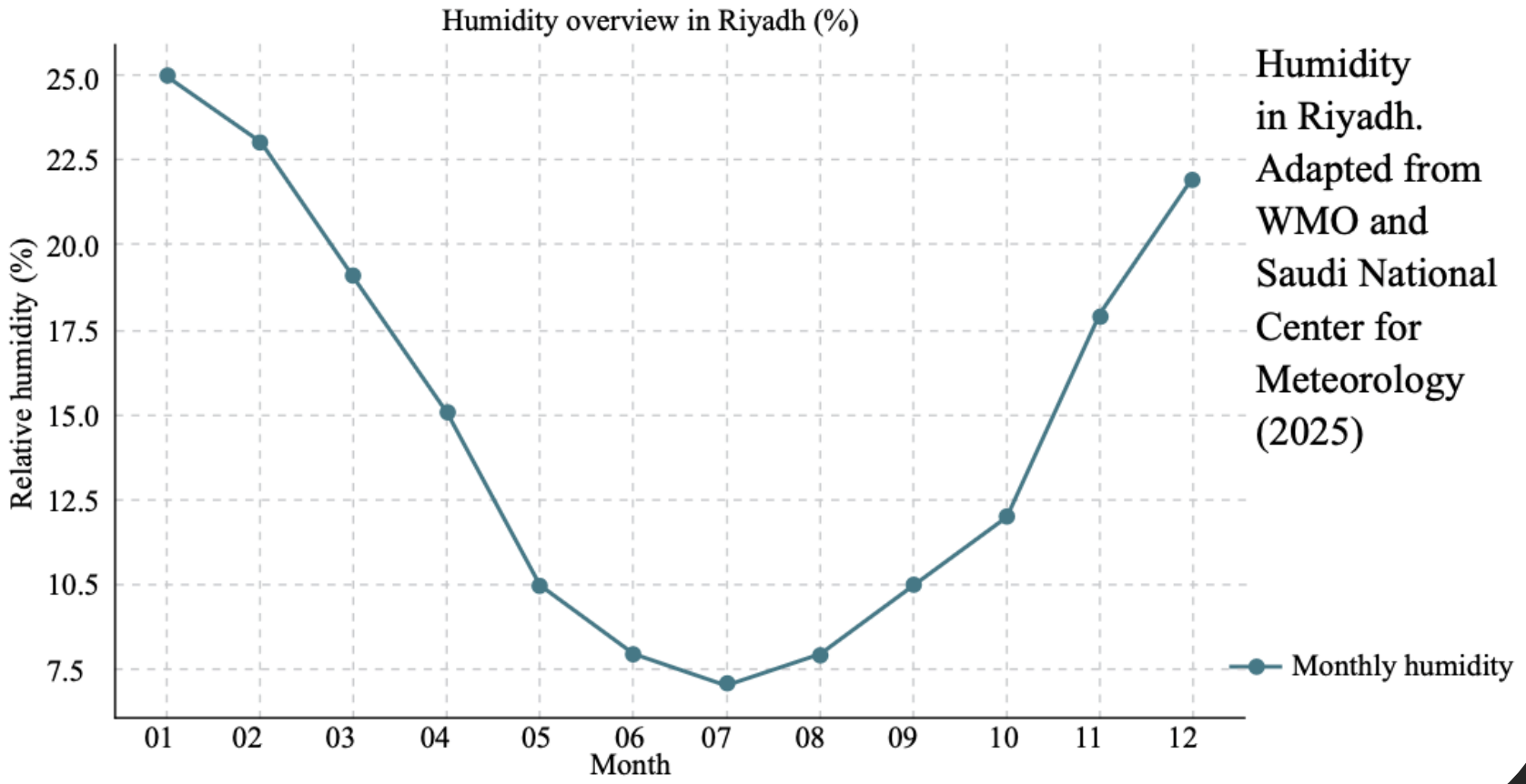


Monthly temperature curve in Riyadh and the UK. Adapted from WMO&Met Office (2025)

- Average highs Riyadh
- Average lows Riyadh
- Average high UK
- Average lows UK



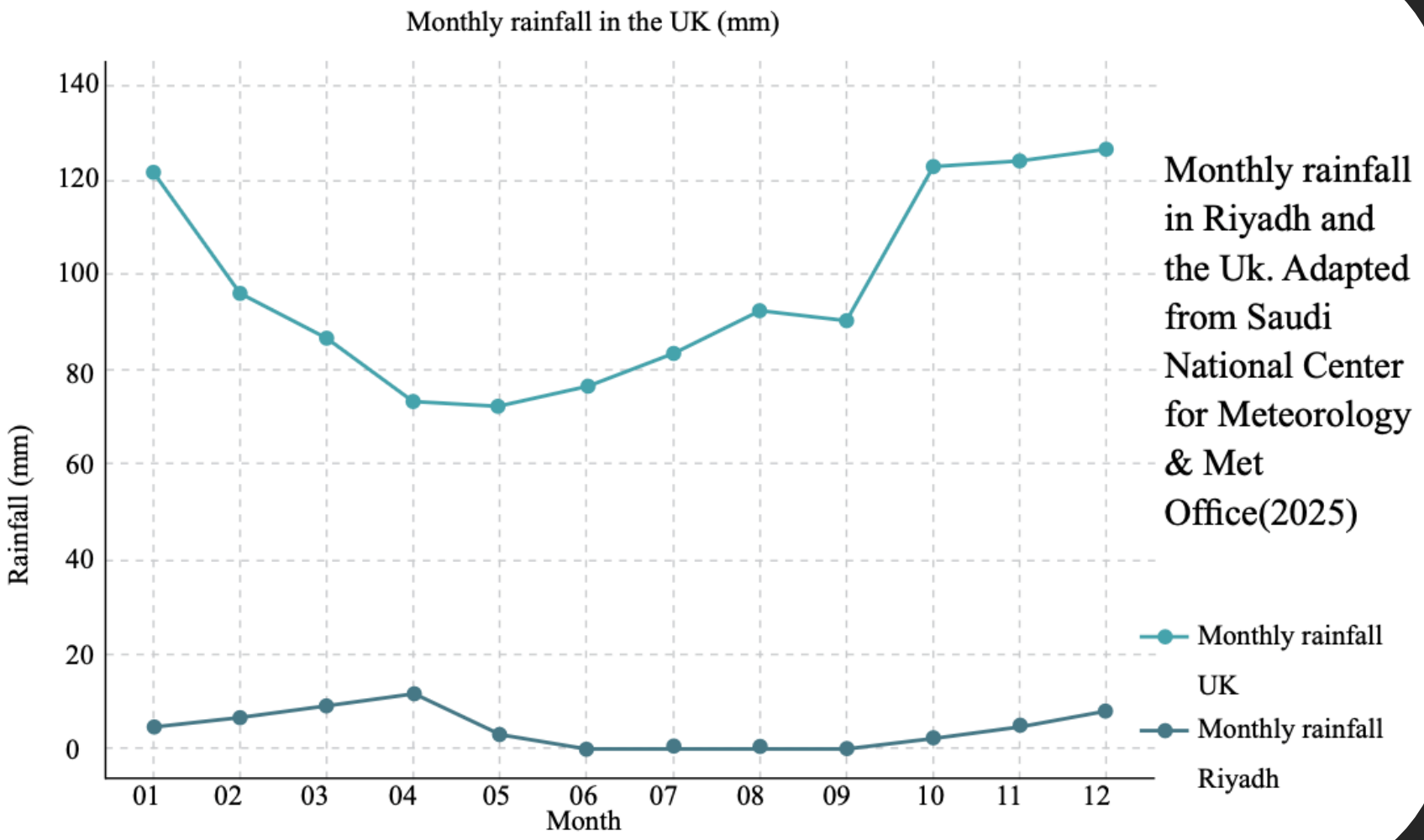
Humidity

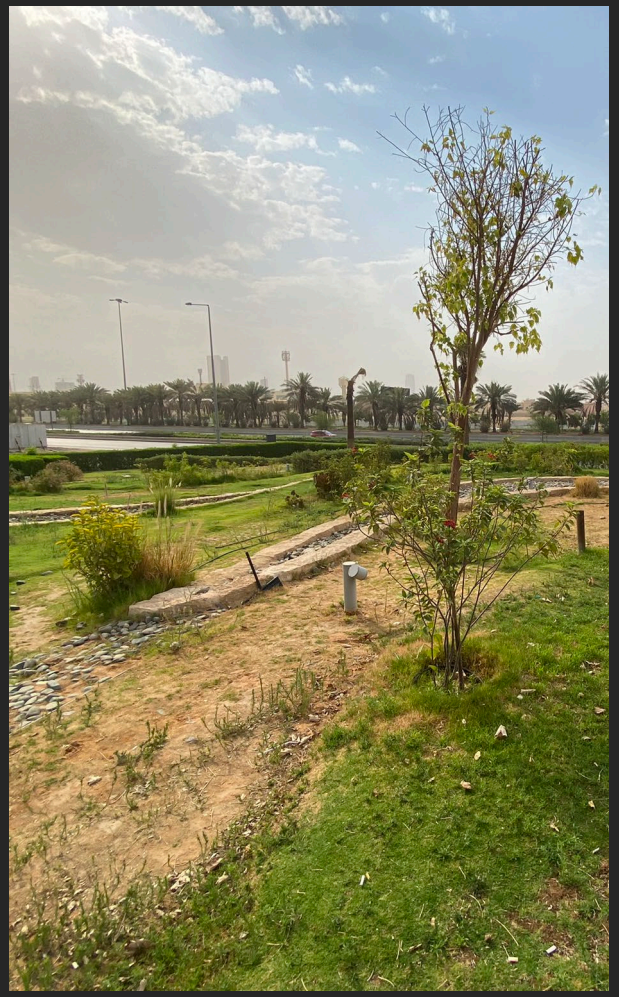


Humidity in Riyadh. Adapted from WMO and Saudi National Center for Meteorology (2025)



Rainfall

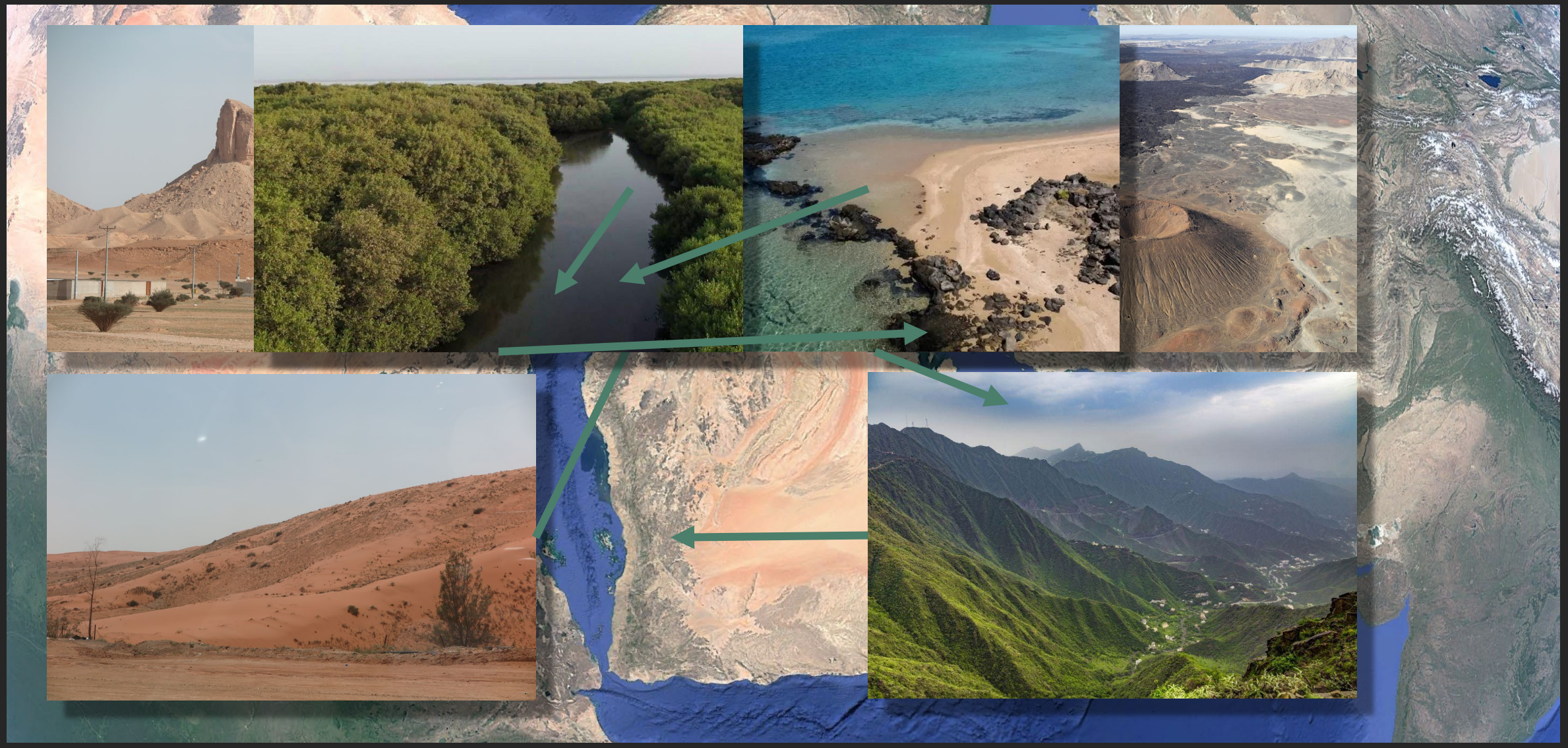

Monthly rainfall in the UK (mm)
Rainfall (mm)
140
120
100
80
60
40
20
0
01
02
03
04
05
06
07
08
09
10
11
12
Month
Monthly rainfall in Riyadh and the Uk. Adapted from Saudi National Center for Meteorology & Met Office(2025)
Monthly rainfall UK
Monthly rainfall Riyadh







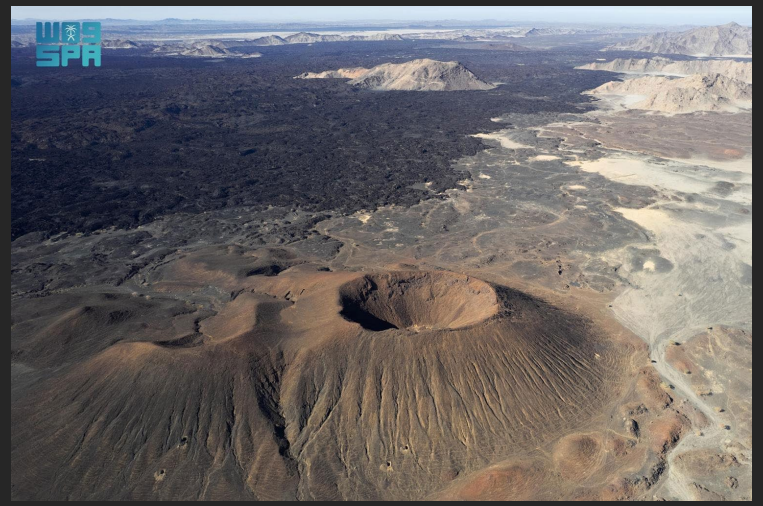


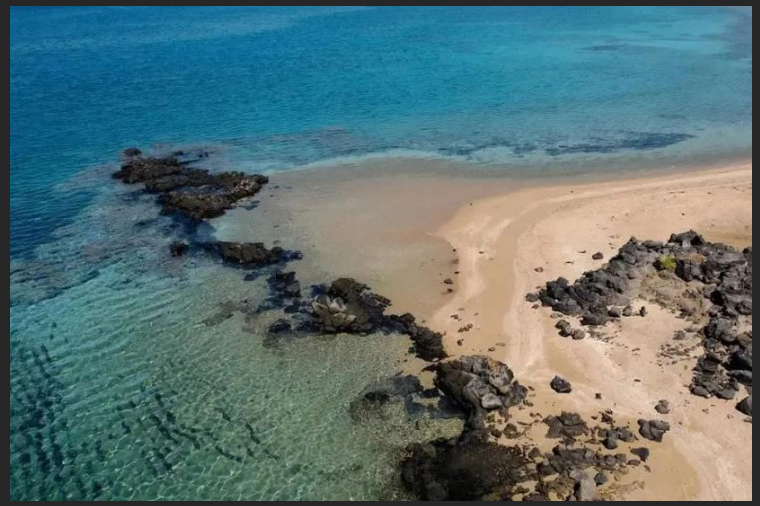


The many faces of Saudi Arabia









ABOVE GROUND PRESSURES

So…what's in the air?



01 **Dust storms**
Visibility, deposition and leaf-surface loading

02 **PM2.5 + PM10**
Fine and coarse particulate exposure

03 **Urban pollution**
A second atmospheric stressor alongside heat

UNDER GROUND REALITIES…

What's underground?

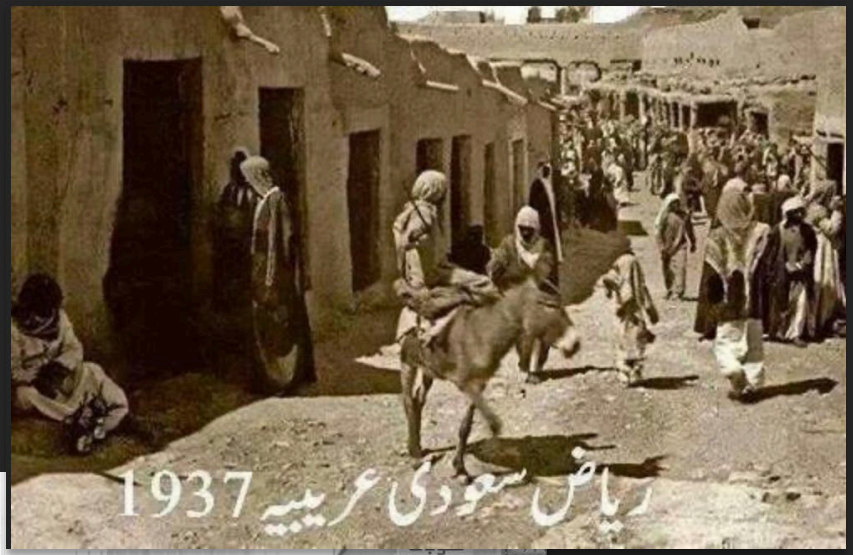


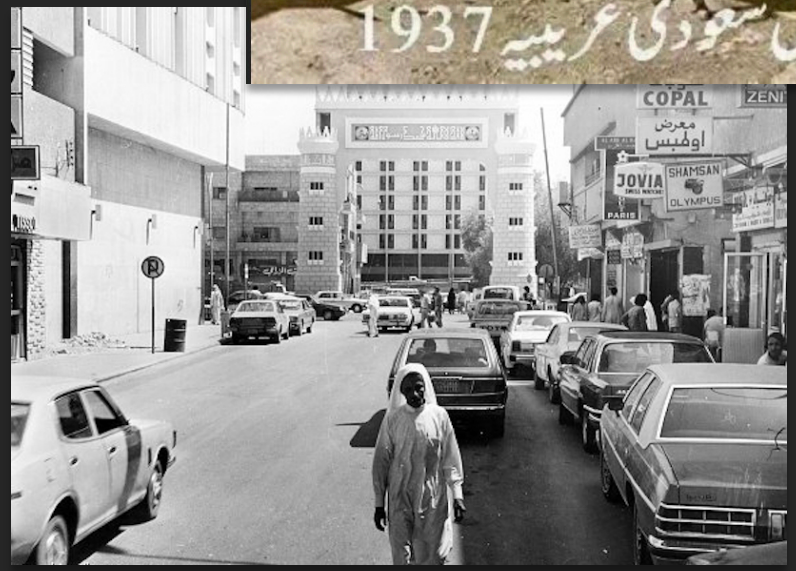
Limestone + **Red/white desert sand**



Evolution of the cities…Riyadh as an example

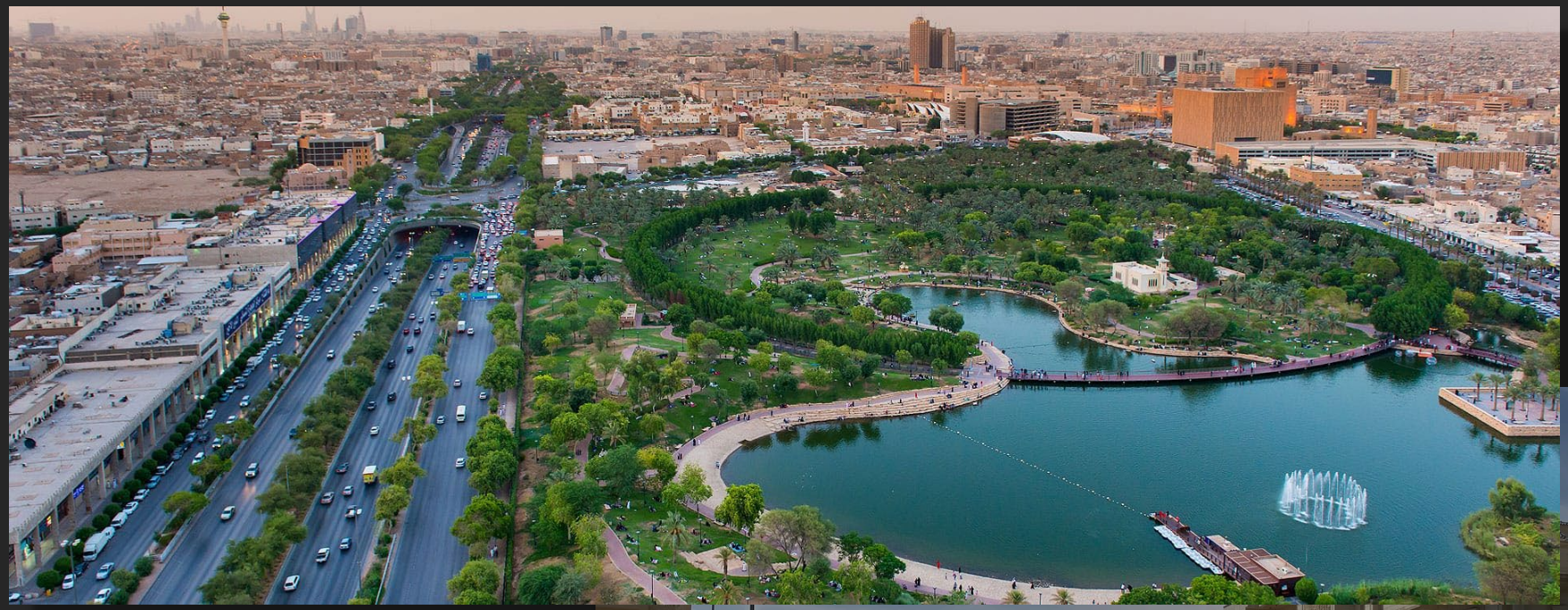


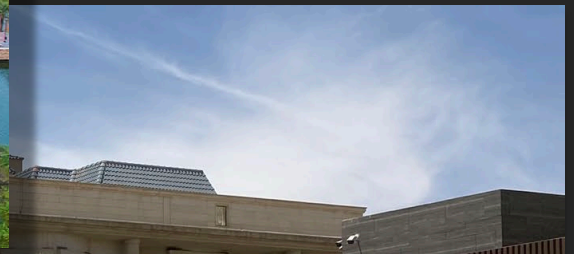




Now and then…..

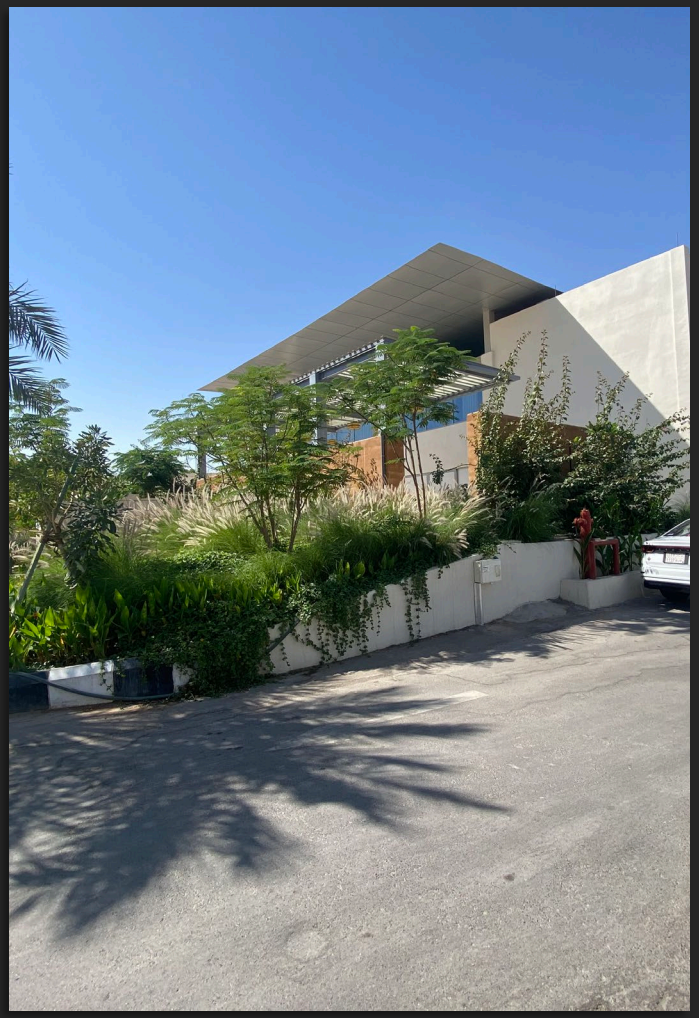
Greening in the past…







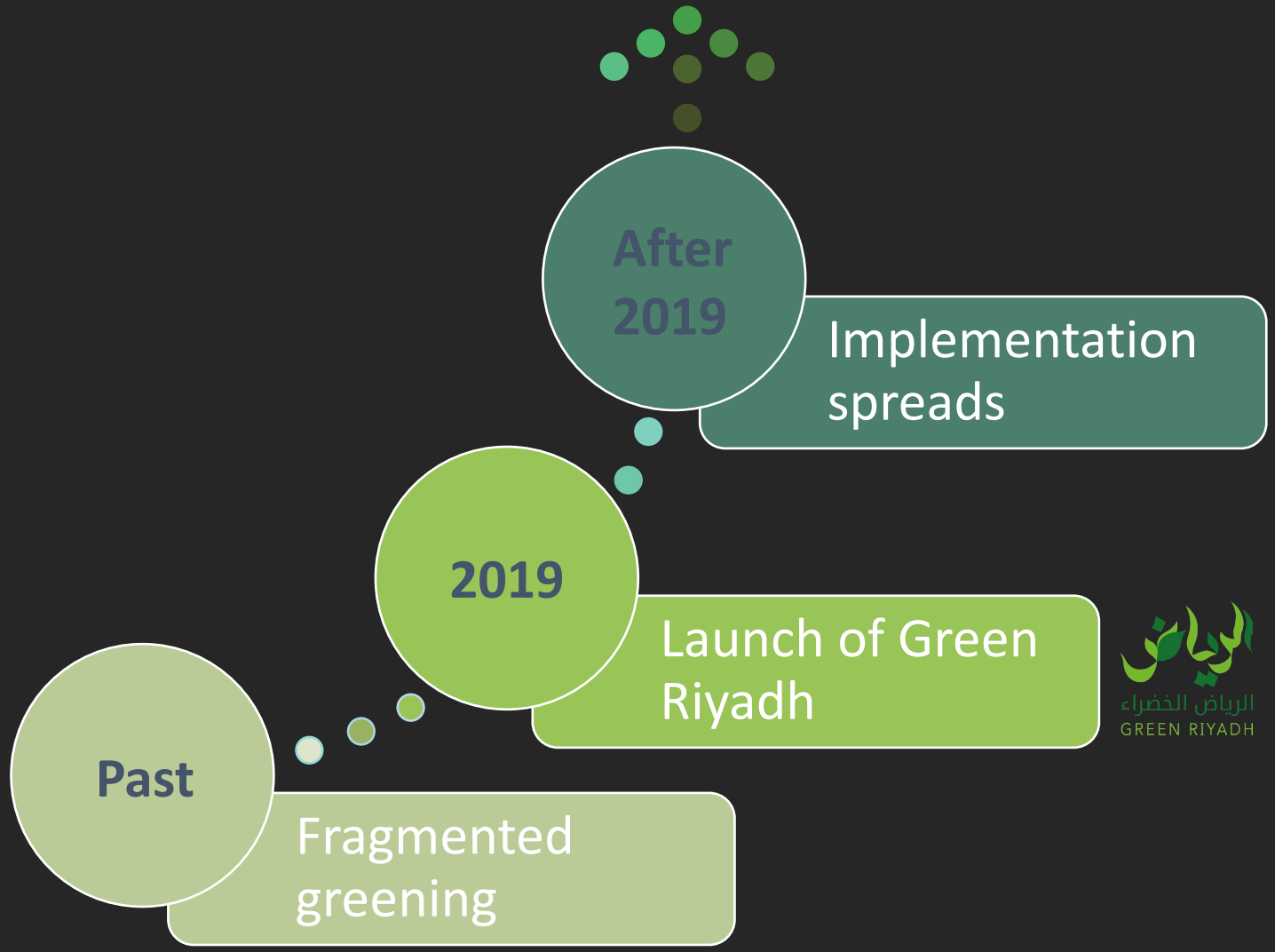
To greening in the present….







When did greening begin?



Greening Saudi Arabia in numbers

01	**10 billion trees and shrubs**	**2026 outlook**
01.1	**600 million by 2030**	**159 million**
02	**74.8 ha Land rehabilitation**	**1 ha**

Significant projects in Saudi





Significant projects in Saudi





Significant projects in Saudi





Significant projects in Saudi





Species selection



Limited native tree species for urban spaces





Resilience through diversity



Where do trees come from?

Imports





Local production



Improving nursery production…How it started







…and where we are now







Even mass production!

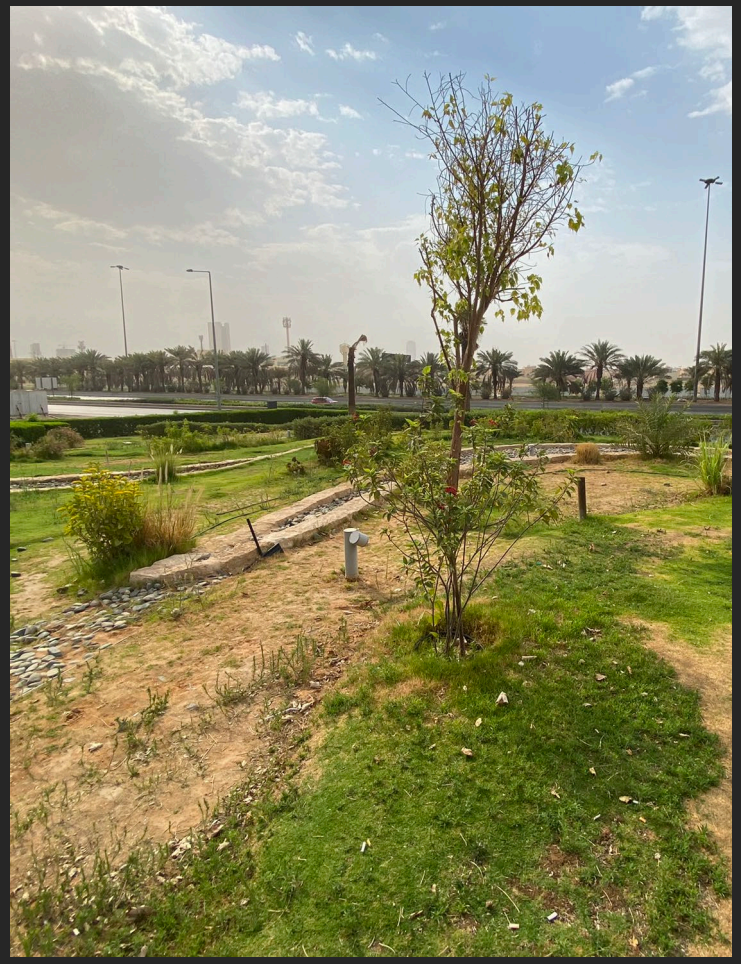




Endless water supply?





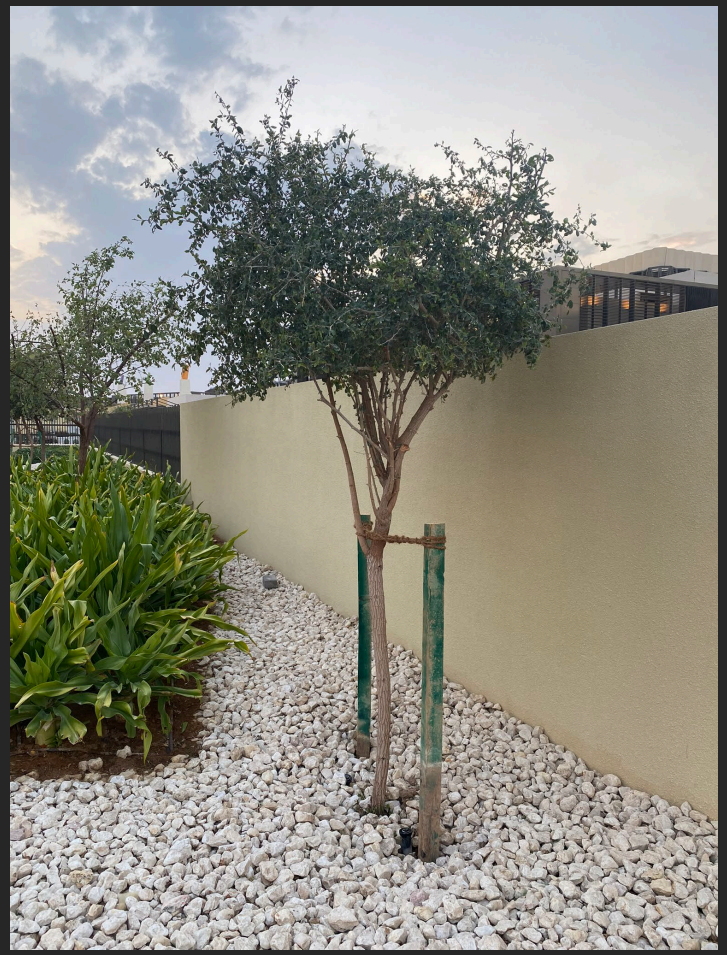


Visual enhancements





Design over functionality, but…





Visually engaging

Encourages movement

Beyond trees

Current issues:

- High obesity (3rd in the Arab World)
- Sedentary lifestyle

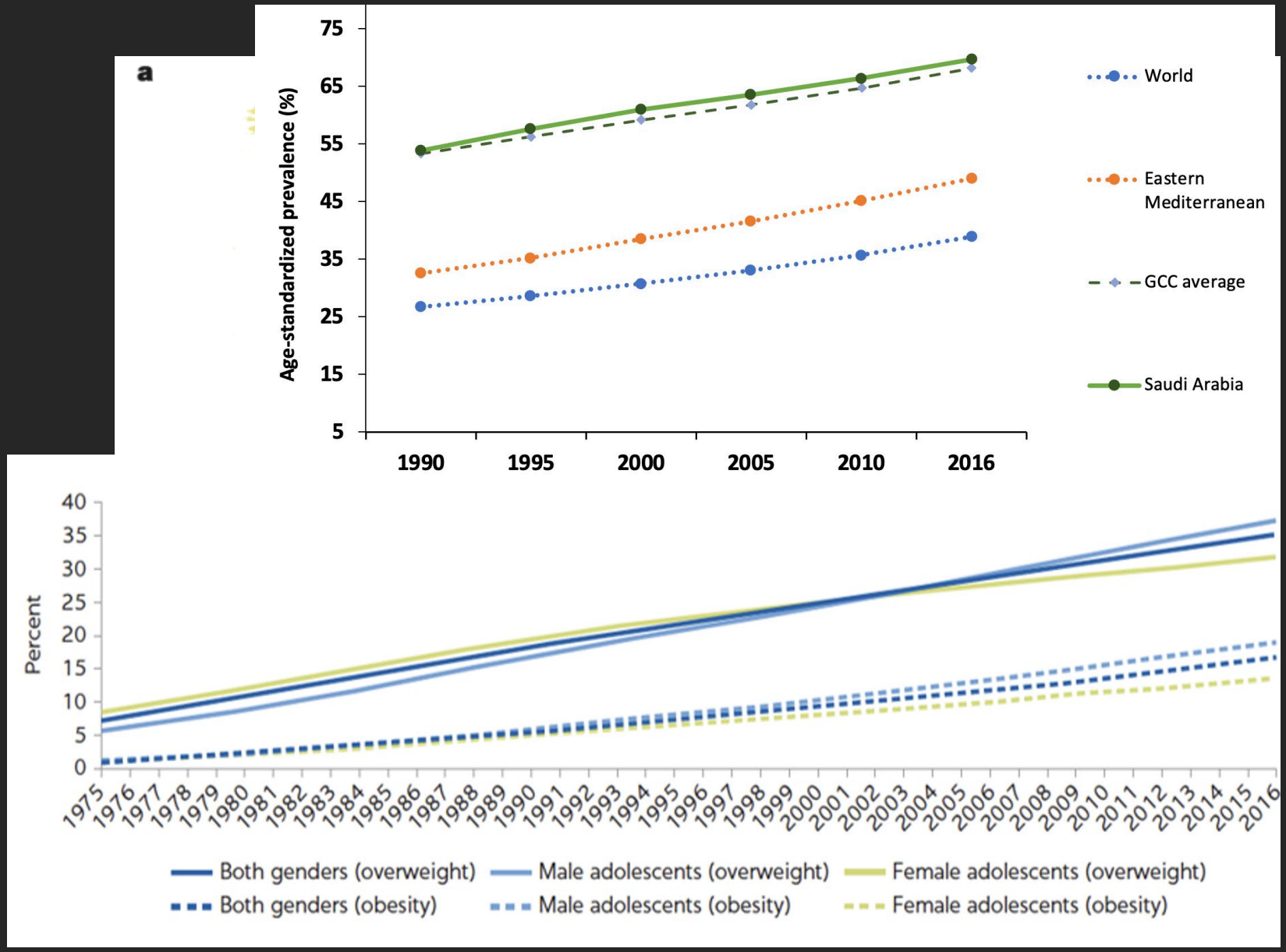


Image credit: Althoff, 2017; Brookings, 2022; WHO, 2019

Something old…





Something old… in a natural setting…



Something new…







Climate realities – What can we learn?







References

- Saudi Vision 2030: https://www.vision2030.gov.sa/en
- Saudi Green Initiative: https://www.sgi.gov.sa
- Plant Manual (1st Edition): https://www.riyadhenv.gov.sa/wp-content/uploads/2016/12/Riyadh-Plants-Manual-English.pdf
- Green Riyadh: https://riyadhgreen.sa/en/
- King Salman Park: https://kingsalmanpark.sa/en
- Sports Boulevard: https://sportsboulevard.sa/en
- MISK City: https://miskcity.sa
- Historic Diriyah: https://www.diriyahcompany.sa/en





Thank you for listening!

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