ERASMUS-EDU-2023-CBHE
Project number: 101129032

Duration: 36 months
(01/01/2024 – 31/12/2026)

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Climate Change of Sustainable Land Management in Central Asia

1- Climate vs Weather and Why Climate Change Matters

Weather vs Climate: Scales, Variability and Trends

CC-W01-V01



INTRODUCTION



Source: Article named Global Warming & Climate Change Facts for Kids. By Aarohi Achwai

- Two major threats to land in Central Asia
- Soil function and land quality decline
- Productivity drops over time
- Climate vulnerability becomes worse



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The Weather

- Weather is the instantaneous or short-term state of the atmosphere at a particular place and time.
- It includes temperature, precipitation, cloud cover, wind, humidity, and pressure.
- Weather changes rapidly because the atmosphere is dynamic and chaotic.
- Reliable forecasts are usually limited to roughly one week.



Source: Climate Change and the New Language of Weather, article By Green Biz



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The Climate

- Climate describes average conditions and variability over long periods.
- It is usually expressed through statistics such as means, ranges, and frequency of extremes.
- Climate can be local, regional, or global, but it always requires long records.
- Climate answers what is typical, not what happened on one single day.



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Weather and Climate

- Weather works on hours to days, while climate is analysed over decades.
- Weather can be highly local, while climate often describes larger spatial patterns.
- Scale changes the question: forecast tomorrow, describe this season, or evaluate long-term warming.
- Students should always ask what scale a dataset or statement is using.



Source: Author's creation

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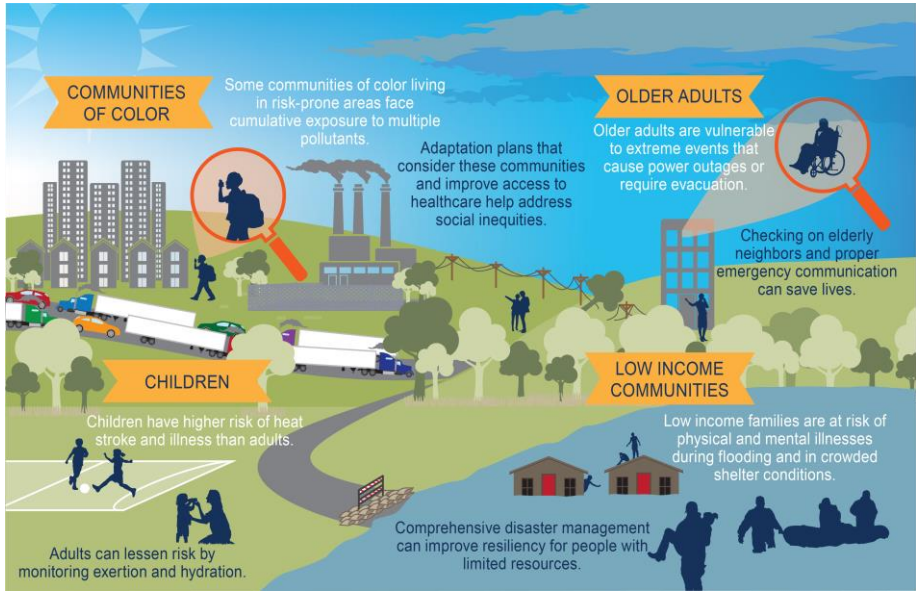
Weather and Climate

- Climate variability refers to temporary fluctuations around a longer-term baseline.
- Internal dynamics include ocean-atmosphere patterns such as ENSO.
- External influences include solar variability and volcanic eruptions.
- Variability can be strong without representing a permanent shift.



Source: Climate change impacts, By NOAA



El Niño and La Niña Explained video on **YouTube**
https://www.youtube.com/watch?v=wVlfyhs64IY

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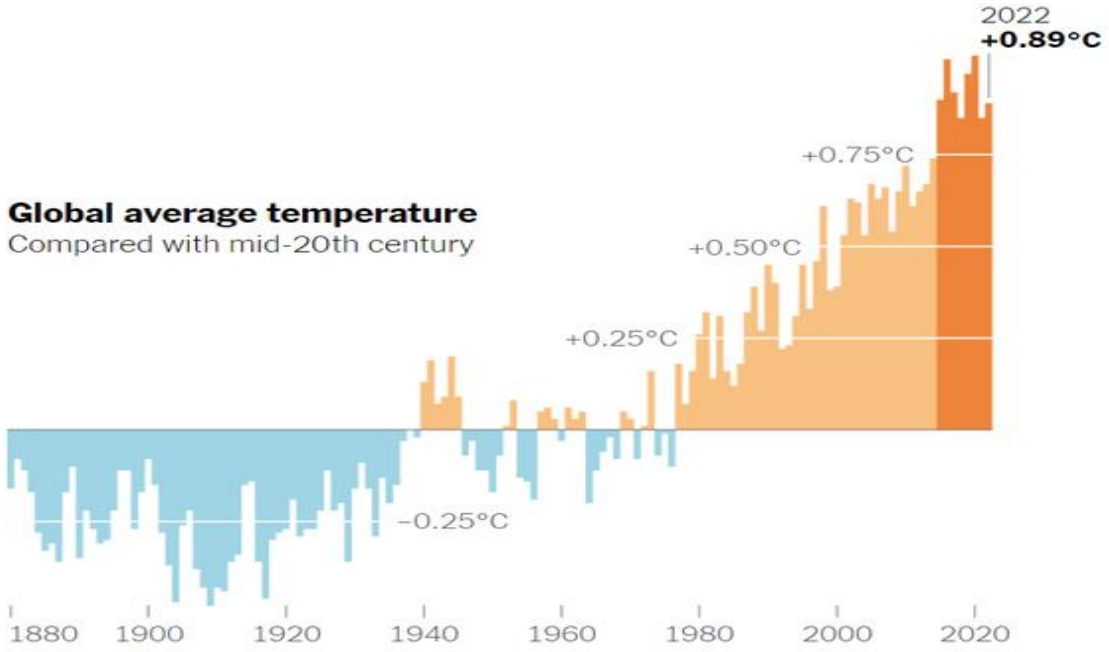
30-Year Climatological Period

- The World Meteorological Organization standard is a 30-year climatological period.
- Thirty years is long enough to reduce short-term noise such as unusual winters or single eruptions.
- It is also short enough to remain useful in a period of rapid modern change.
- Climate normals provide a baseline for comparison between periods and places.



Source: NASA Goddard Institute for Space Studies



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Observation Methods



Source: NOAA / NWS ASOS



Source: NASA Blue Marble



Source: NOAA PMEL KEO buoy

- Climate knowledge comes from weather stations, satellites, ocean observations, and historical records.
- Long records allow averages, trends, and extremes to be estimated with more confidence.
- No single measurement proves climate change on its own; interpretation depends on combined evidence.



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Land Managment

- Land managers must respond to both weather shocks and climate trends.
- Weather affects immediate operations, such as irrigation timing or storm response.
- Climate affects long-term strategy, such as crop choice, soil conservation, and water storage.
- Confusing the two leads to poor planning.



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