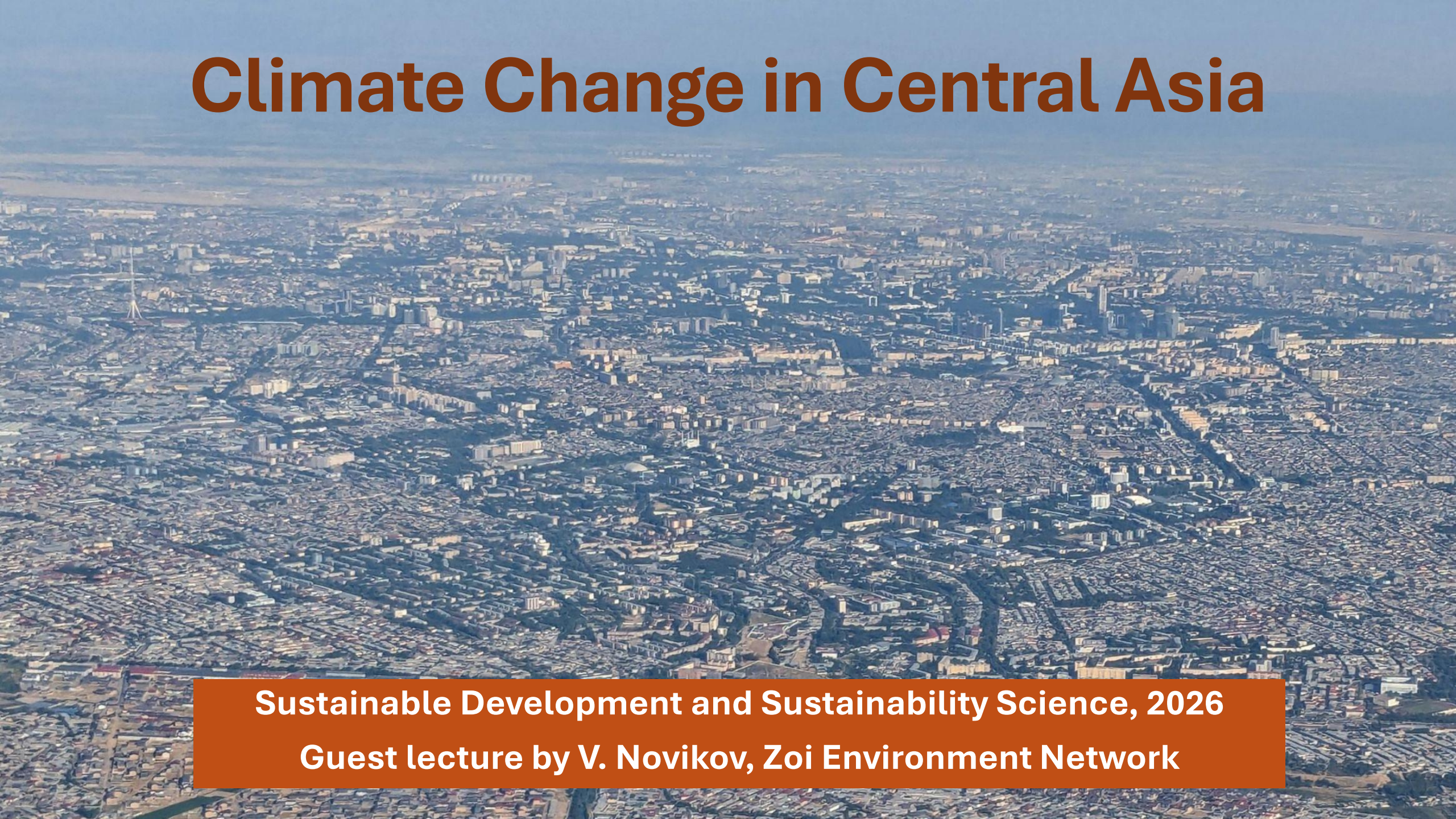
Climate Change in Central Asia



Sustainable Development and Sustainability Science, 2026

Guest lecture by V. Novikov, Zoi Environment Network

zoï environment network

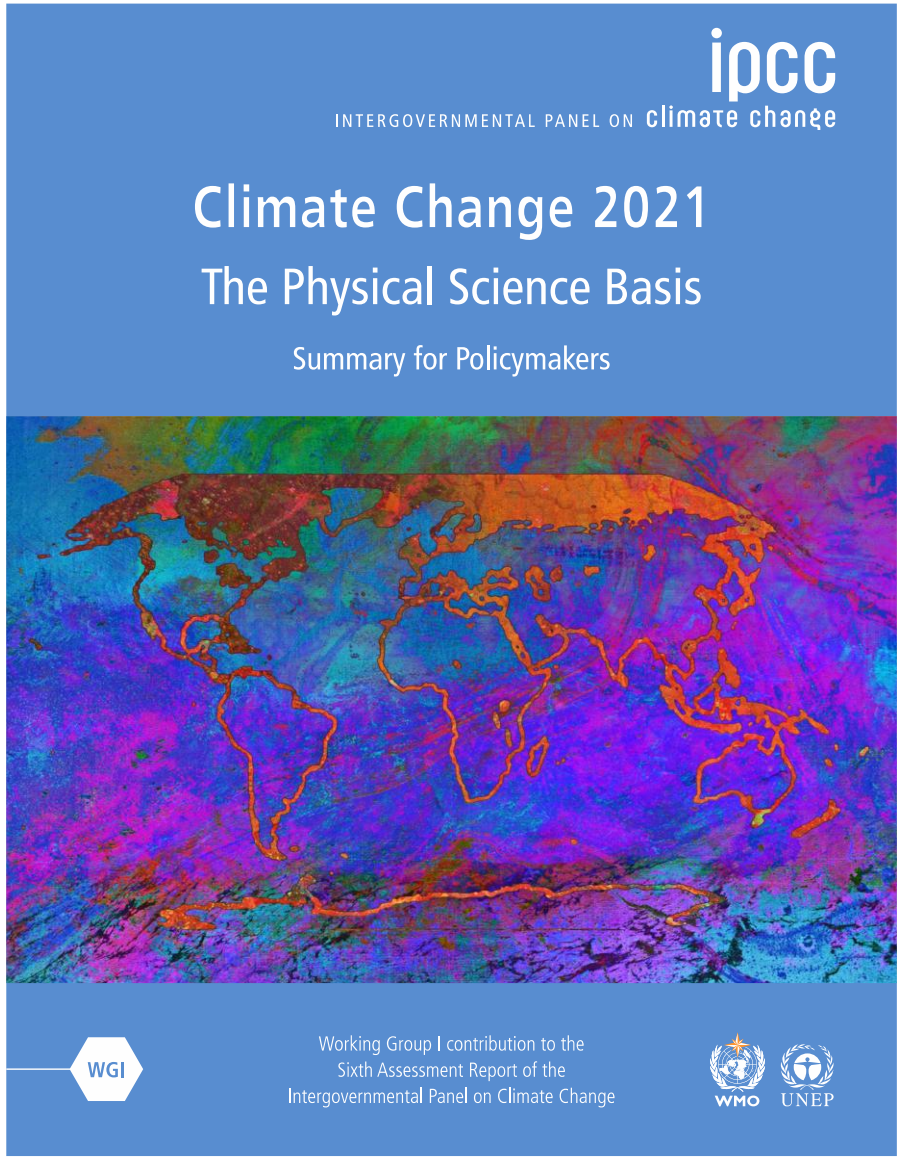
Zoï Environment Network is a non-profit organization that helps build sustainable societies through **informed analysis, visual communication, design** and **action**.

Our topics are

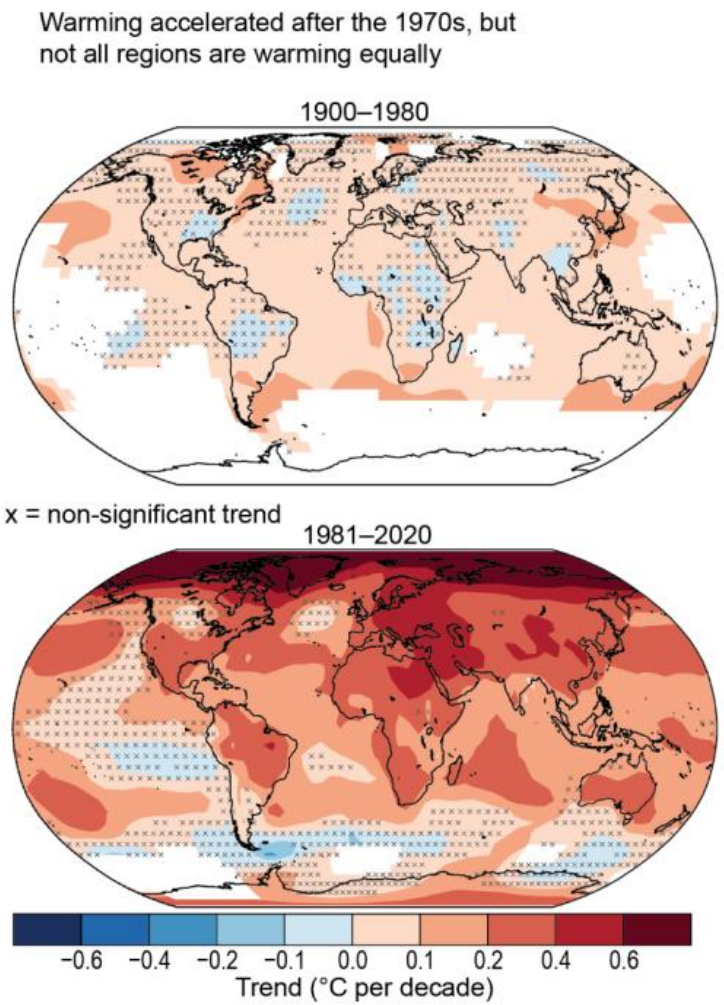
- Climate change
- Biodiversity
- Chemicals and Waste
- Security and conflict
- Water
- Access to information

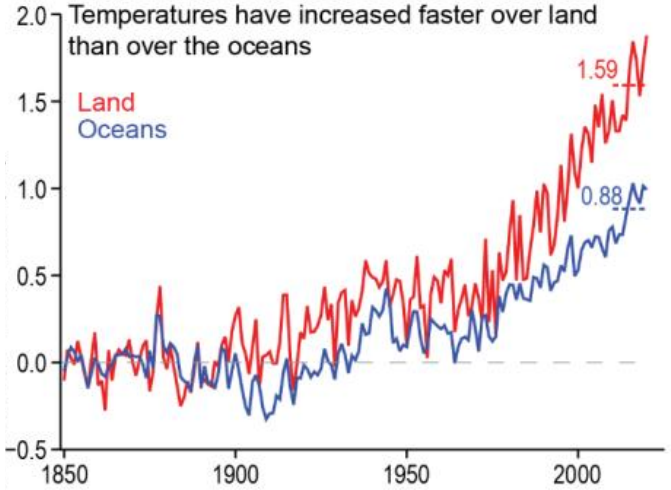
https://zoinet.org/products/

From Global to Regional, National and Local Climate Change Information



https://www.ipcc.ch/





IPCC Global Climate Assessments and WMO reports

https://library.wmo.int/records/item/69674-state-of-the-climate-update-for-cop30

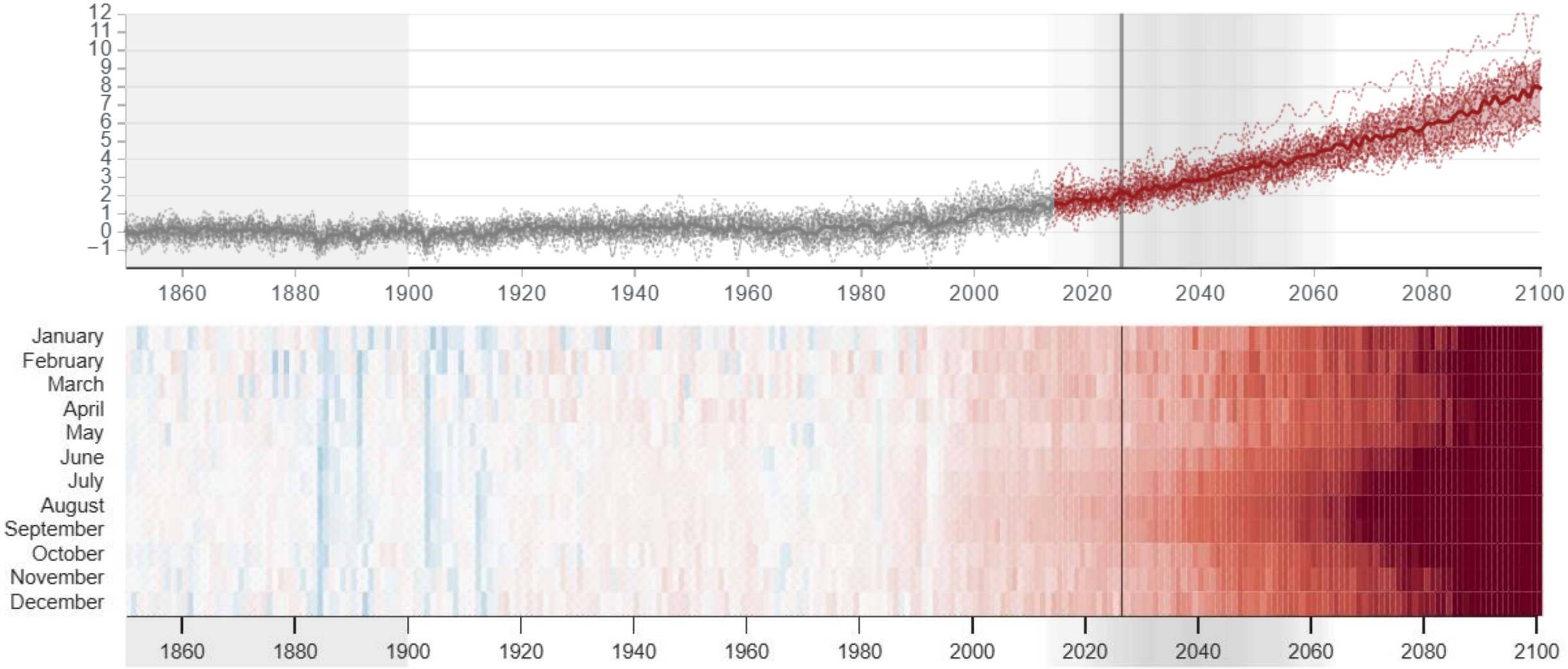
PROGRAMME OF THE EUROPEAN UNION

Copernicus Europe's eyes on Earth

Climate Change Service climate.copernicus.eu

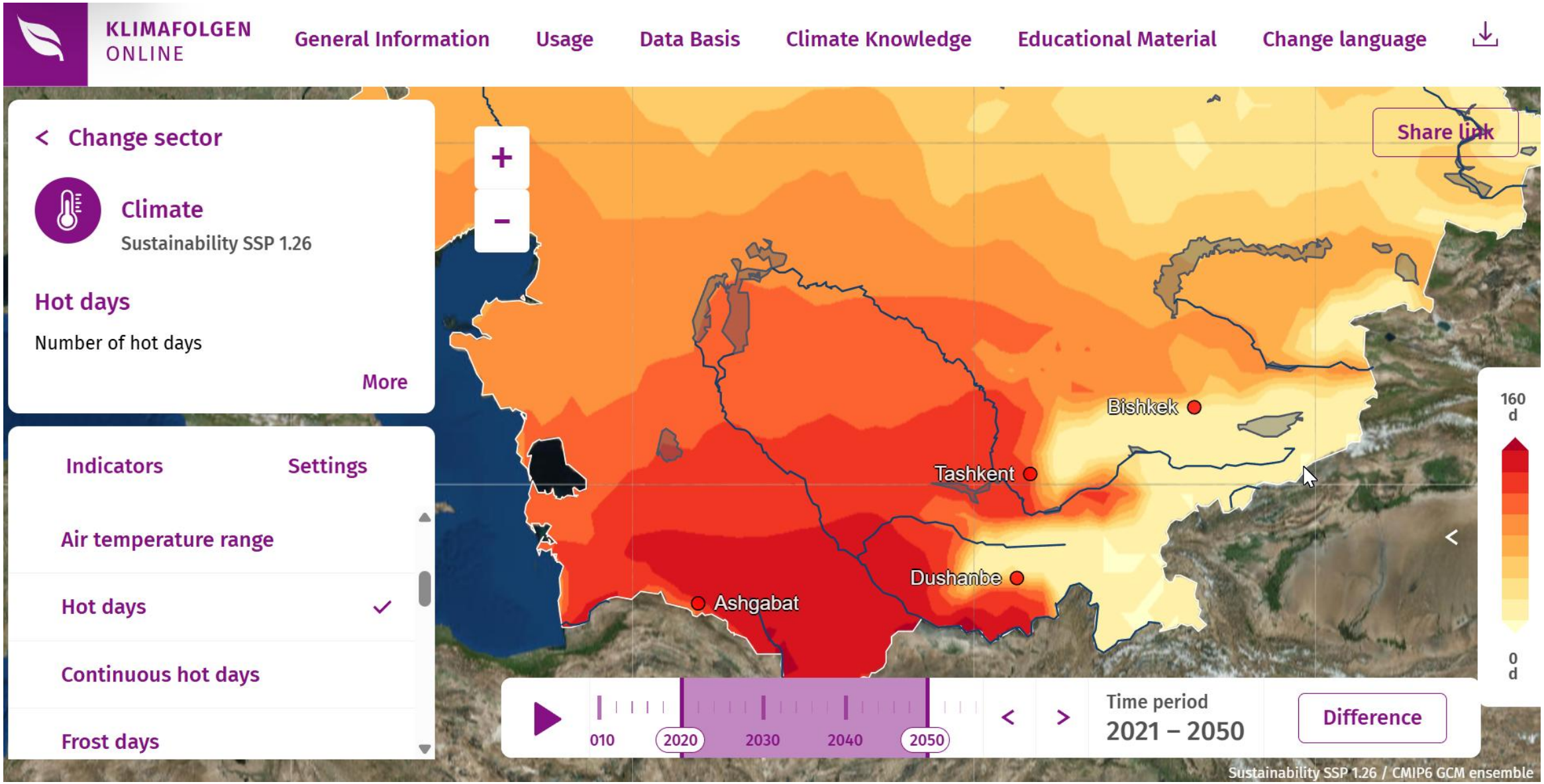
IMPLEMENTED BY ECMWF

Copernicus Climate Change Atlas: Western and Central Asia



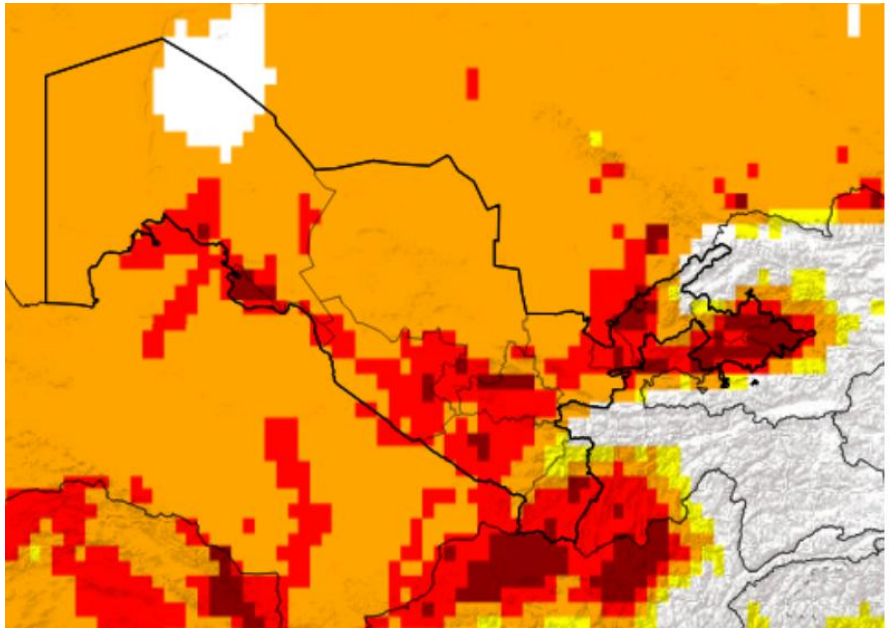
https://atlas.climate.copernicus.eu/atlas

PIK (Potsdam Climate Institute) Climate Change Portal for Central Asia



https://www.klimafolgenonline.com/ca/index_de.html?language_id=de

World Bank Climate Knowledge Portal & Climate and Development / Risk Reports

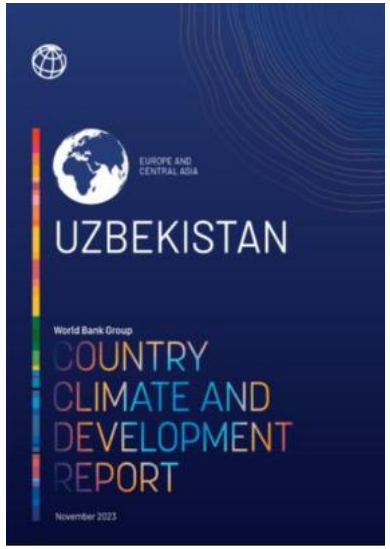


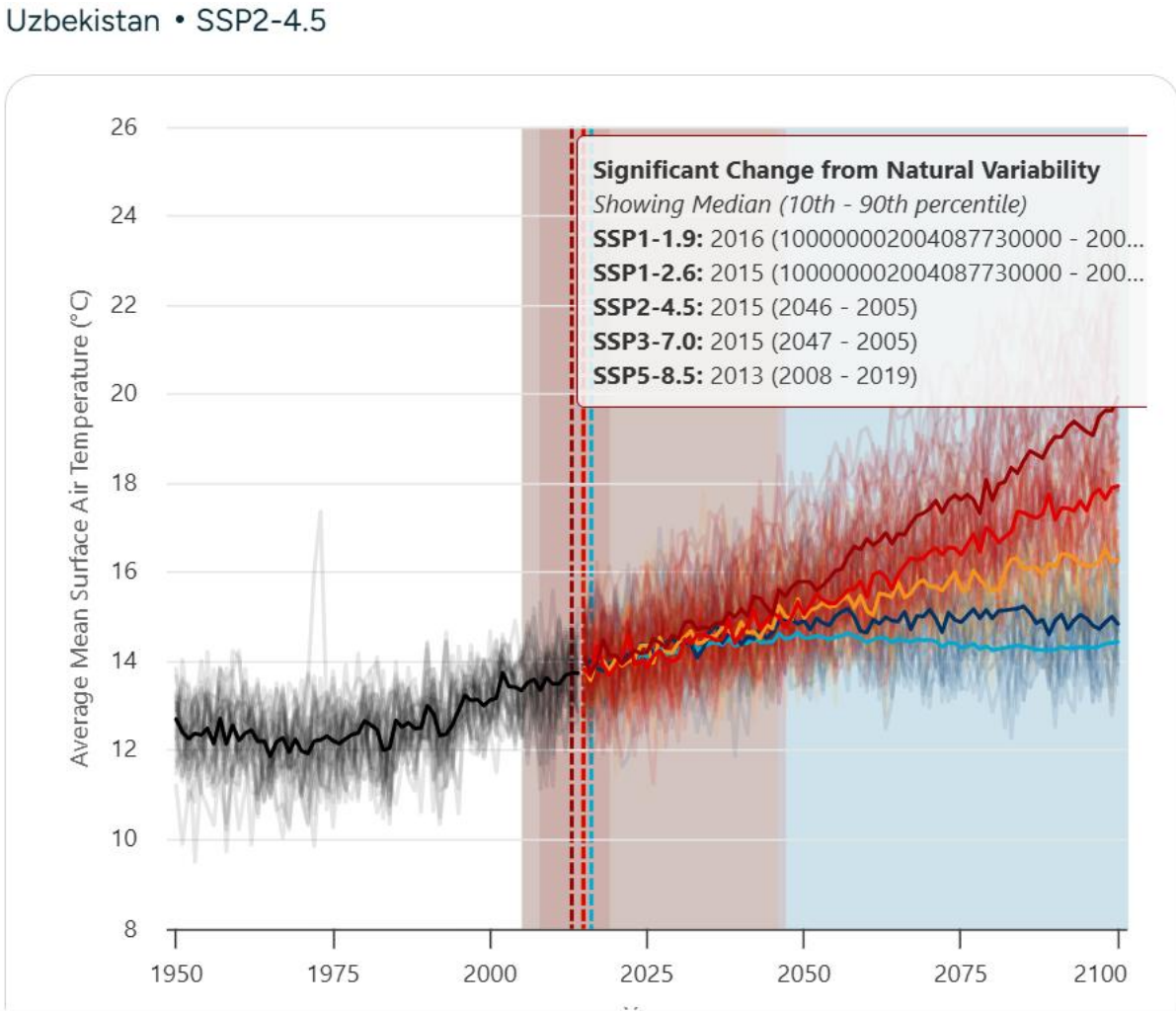
What you can see in this figure
The map shows the level of risk when combining temperature (hazard) and population (exposure), for different periods into the future and different warming scenarios. Risk Categorizations are calculated to account for both climate conditions (in this

https://www.worldbank.org/en/publication/country-climate-development-reports

https://openknowledge.worldbank.org/handle/10986/40608

https://www.adb.org/sites/default/files/publication/736686/climate-risk-country-profile-uzbekistan.pdf





https://climateknowledgeportal.worldbank.org/explore

Central Asia Climate Information Portal (CACIP)

Country Climate Risk Portal: Uzbekistan

Contents

- Country Profile
  - Key Facts & Figures
  - Geography & Population
  - Climate Summary
- Climate Risks by Sector
  - Agriculture
  - Energy
  - Water
  - Transport
  - Hazards
  - Health

Country Profile

Key Facts & Figures

425,400 km2	37.86 million	18.6 million (49%)	19.3 million (51%)	84 / km2
Area	Population	Rural Population	Urban Population	Population Density

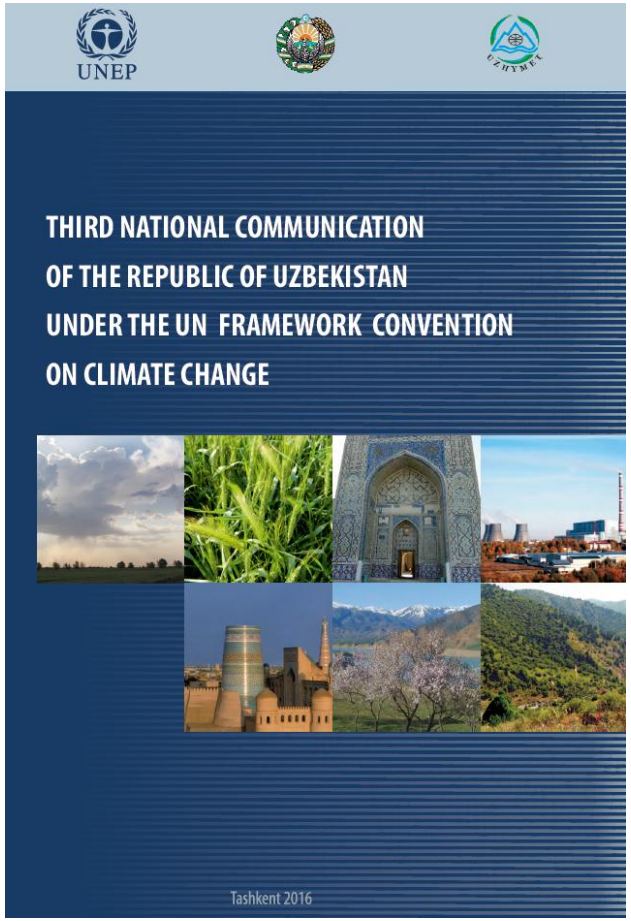
Geography & Population

With a territory of about 425,400 km², Uzbekistan has an estimated permanent population of 37.86 million in mid-2025. This gives a population density of around 84 inhabitants per km². About 18.6 million (49%) people live in rural areas, while around 19.3 million (51%) reside in urban centers.

Feedback

https://centralasiaclimateportal.org/country-climate-risk-portal-uzbekistan/

National Official Sources of Climate Change and Hydromet Information



https://unfccc.int/non-annex-I-NCs

https://unfccc.int/BURs

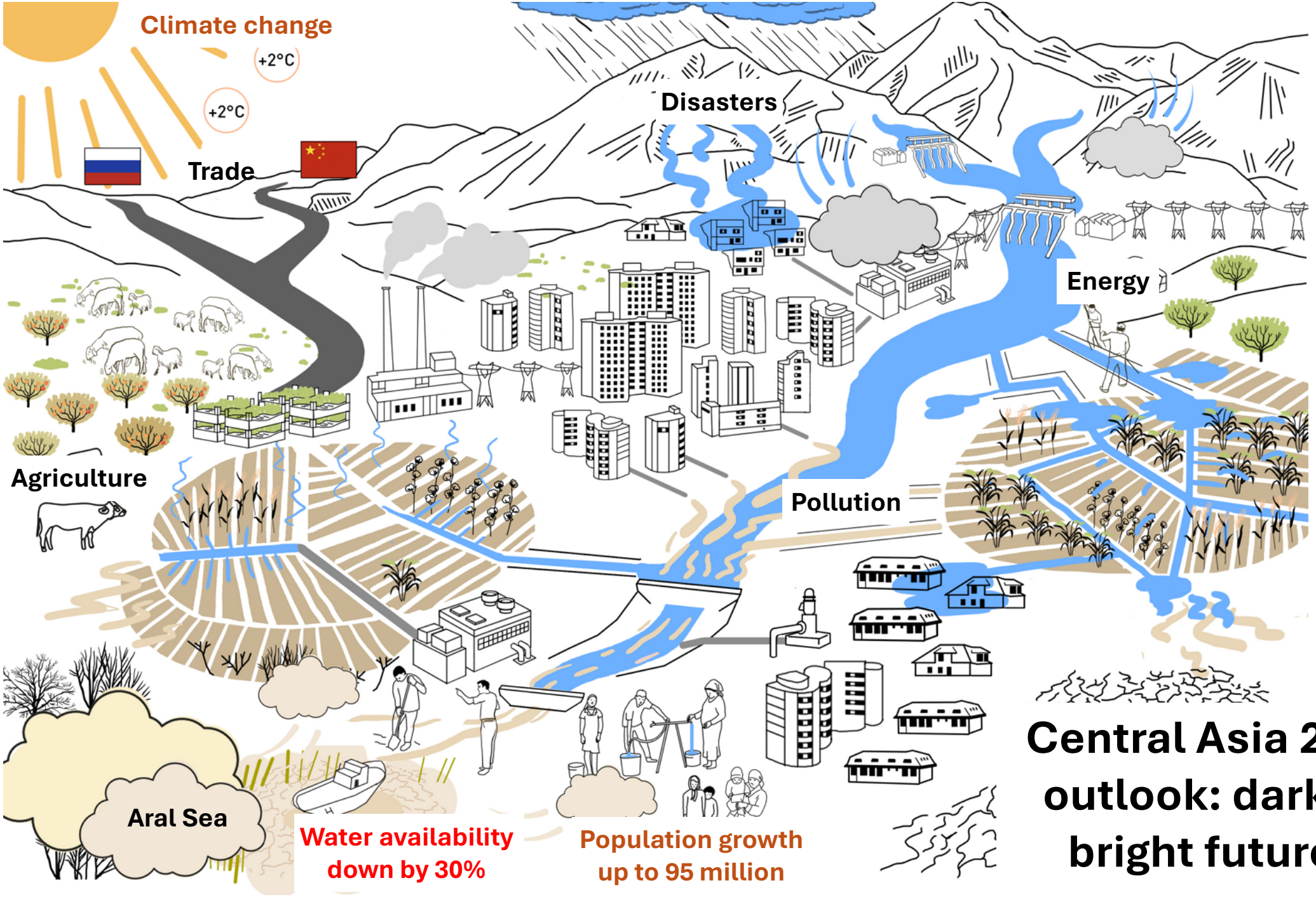
National Communications, Biennial Update and Transparency Reports

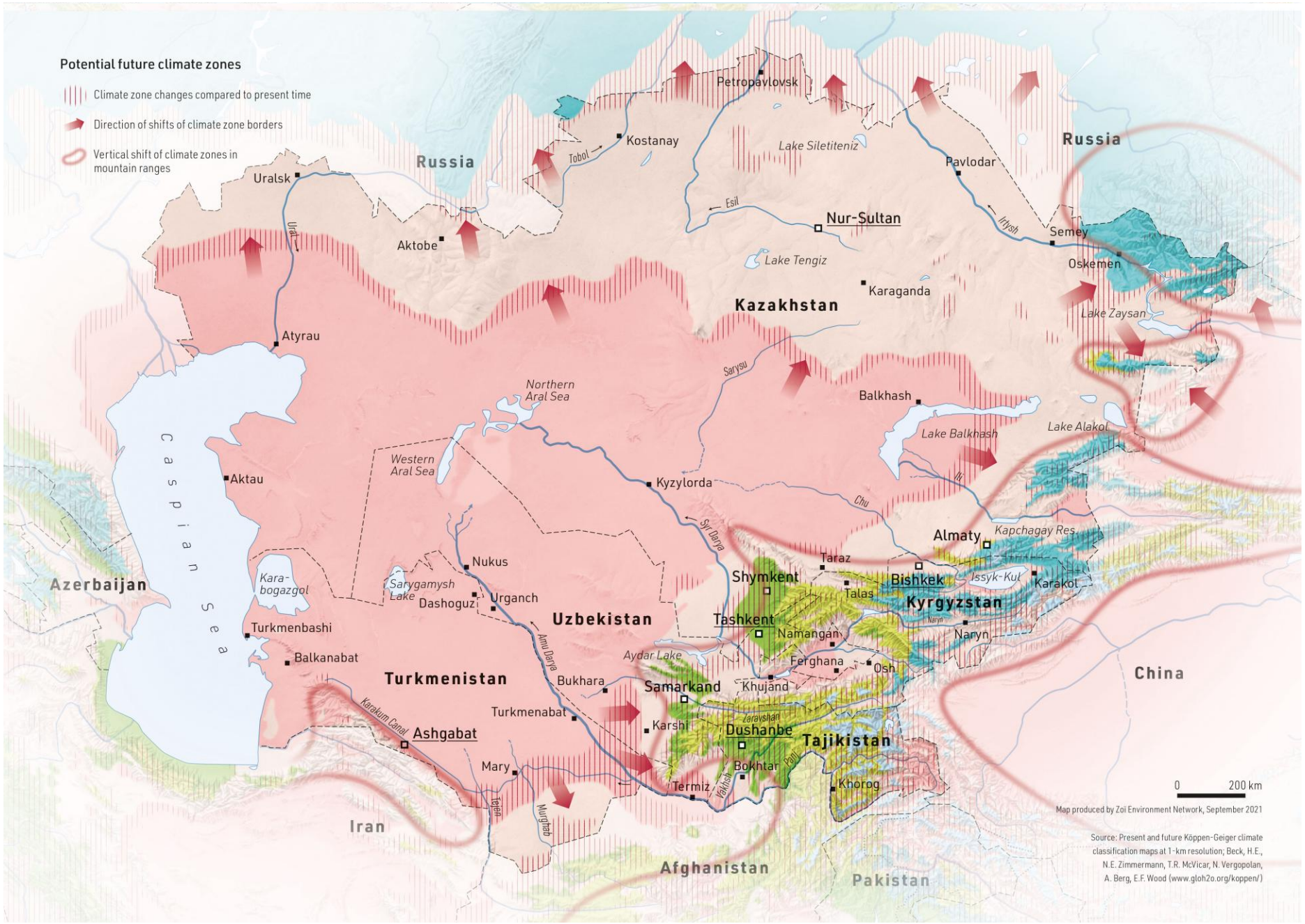
https://unfccc.int/NDCREG

Nationally Determined Contributions (NDCs)

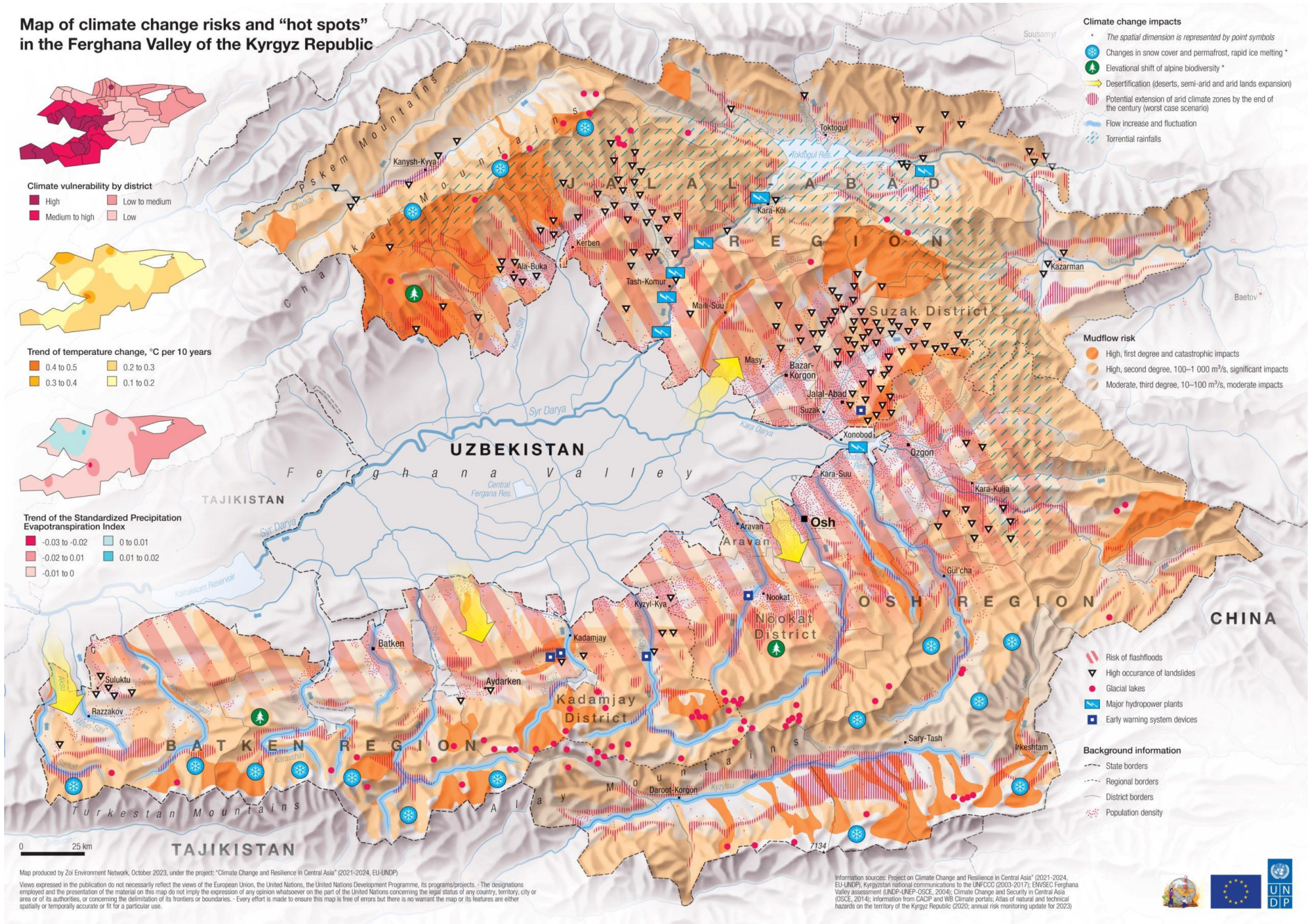
https://gov.uz/oz/hydromet

Weather and climate reports by the National Hydromet Services (NHMS)

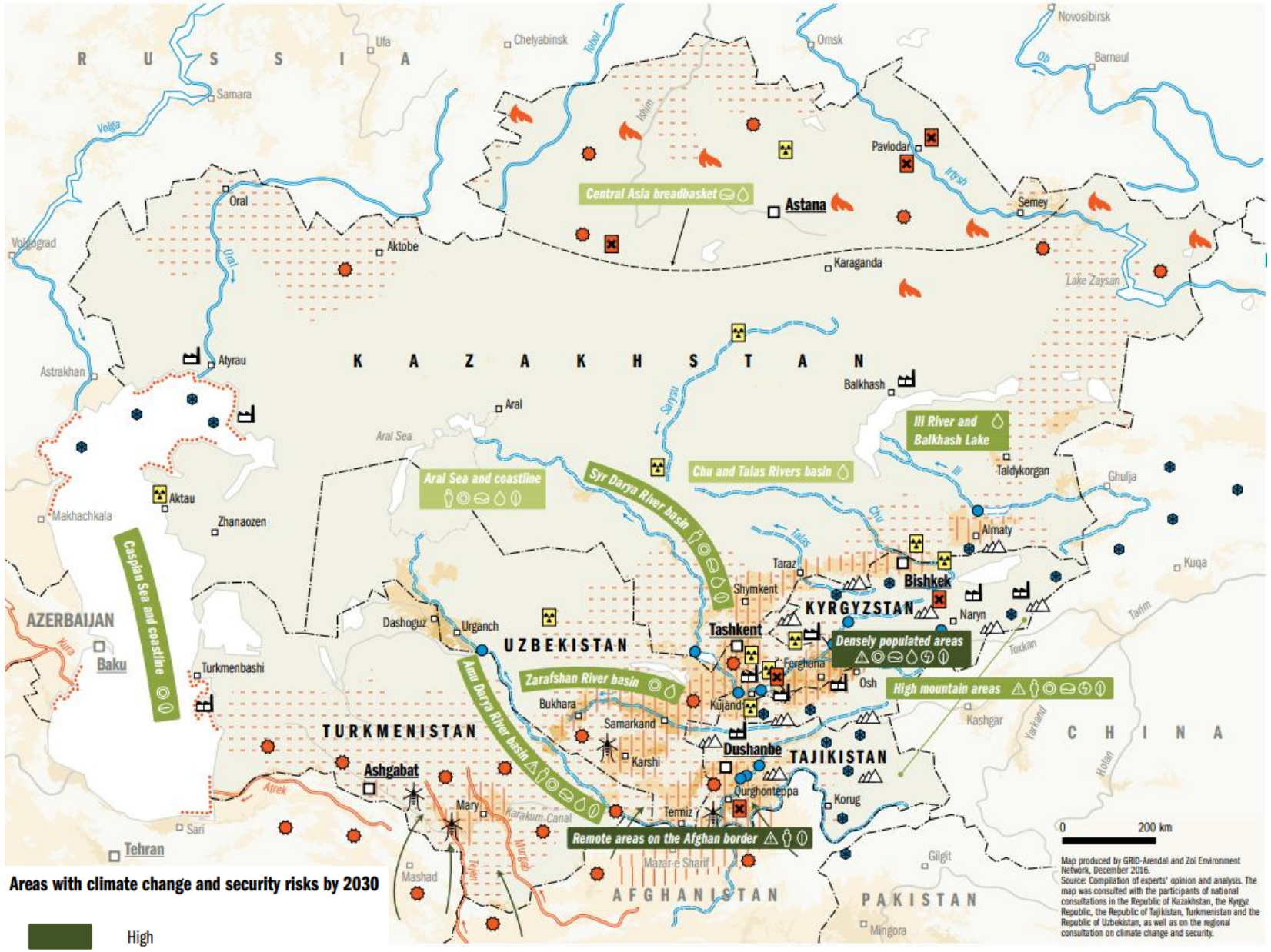

Climate change
+2°C
+2°C
Trade
Disasters
Energy
Agriculture
Pollution
Aral Sea
Water availability down by 30%
Population growth up to 95 million
Central Asia 2050 outlook: dark or bright future?



https://zoinet.org/product/cacip-review/



https://zoinet.org/product/ferghana-valley-cc-map/



Map produced by GRID-Arendal and Zoï Environment Network, December 2016.
Source: Compilation of experts' opinion and analysis. The map was consulted with the participants of national consultations in the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, Turkmenistan and the Republic of Uzbekistan, as well as on the regional consultation on climate change and security.

Areas with climate change and security risks by 2030

- High
- Medium
- Low

Category of security implication

- Social insecurity
- Human health insecurity
- Economic and livelihood insecurity, damage to infrastructure
- Food insecurity
- Water insecurity, water resources scarcity
- Energy insecurity
- Land degradation, biodiversity, cultural and natural heritage
- Densely populated and industrialized regions near mountains: environmental stress, water and energy insecurity
- Desertification
- High mountain areas at risk: energy insecurity, major ecosystem changes, natural disasters, infrastructure damages
- Caspian Sea: risk of flooding due to sea level fluctuation
- Fire-prone area
- Severe drought impacts

Predicted change in annual river flow

- Projected increase of river flow by mid-century
- Projected increase of river flow till 2030 - 2050 followed by overall decrease and seasonal change
- Projected decrease of river flow by 2030 - 2050
- no change/no information

https://zoinet.org/product/climate-change-and-security/

Climate and Biodiversity Alignment

Examples of win-wins and tradeoffs

Planting fast-growing, fruit-bearing trees increases carbon sequestration and forest cover without addressing the problem of forest degradation

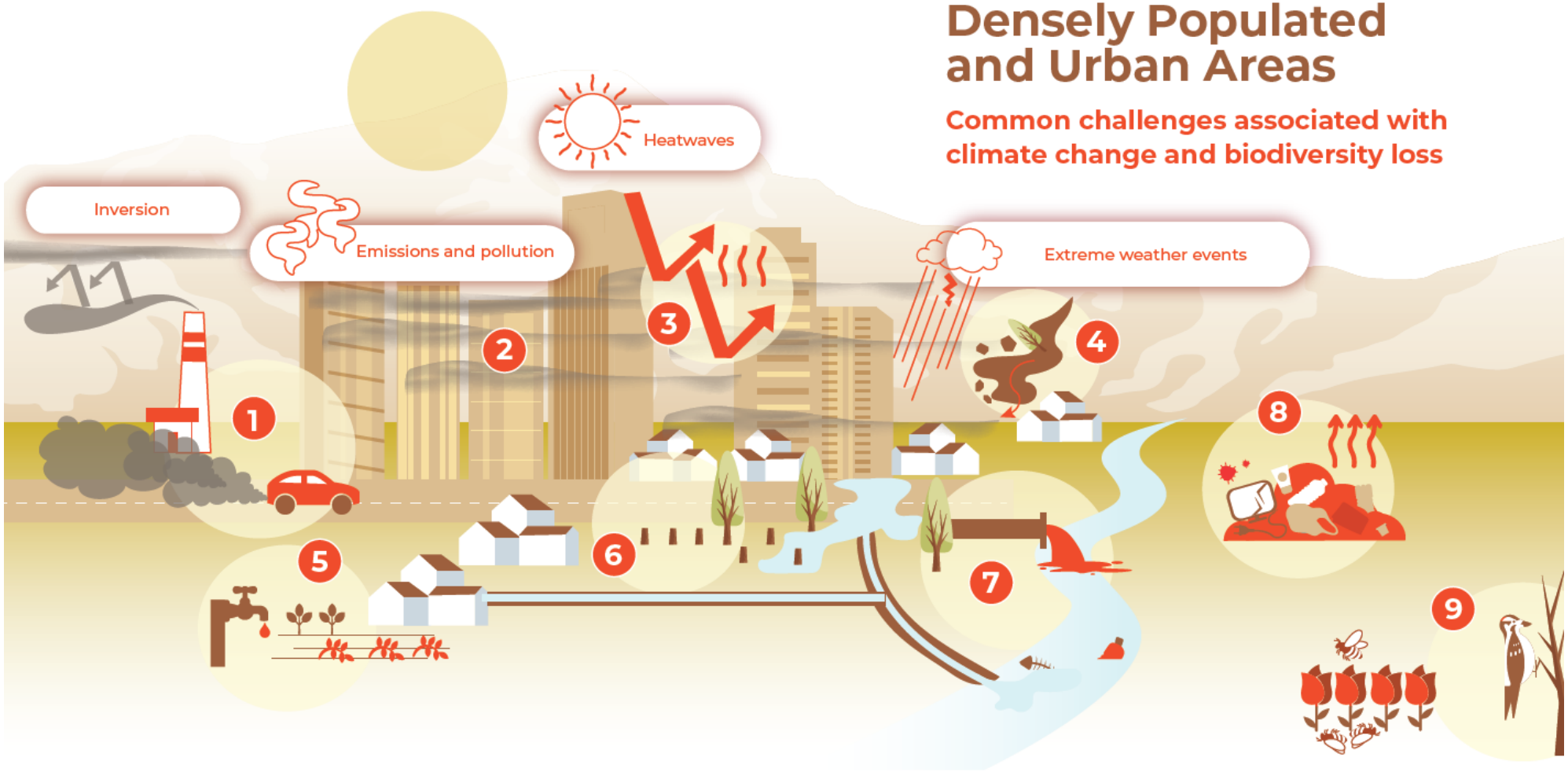
Access to clean energy and an increase in its production without harm to nature reduces the cutting of trees and shrubs and coal consumption

Regulating pasture usage and implementing crop rotation are beneficial for conservation and adaptation. However, converting new lands for agricultural use can result in the loss of carbon and unique species of flora and fauna

https://zoinet.org/product/cc-biodiv-kyrgyzstan/

Densely Populated and Urban Areas

Common challenges associated with climate change and biodiversity loss



1. Poor air quality, especially during inversions
2. Dense urban development and climate-blind planning impede airflow
3. Heated roads, buildings, and poor air circulation create an urban heat island
4. Mudflows
5. Lack of water resources
6. Lack of green spaces
7. Poor sewage treatment and urban drainage
8. High temperatures worsen pollution, landfill fires
9. Reduction in the number of pollinators and birds that feed on insects

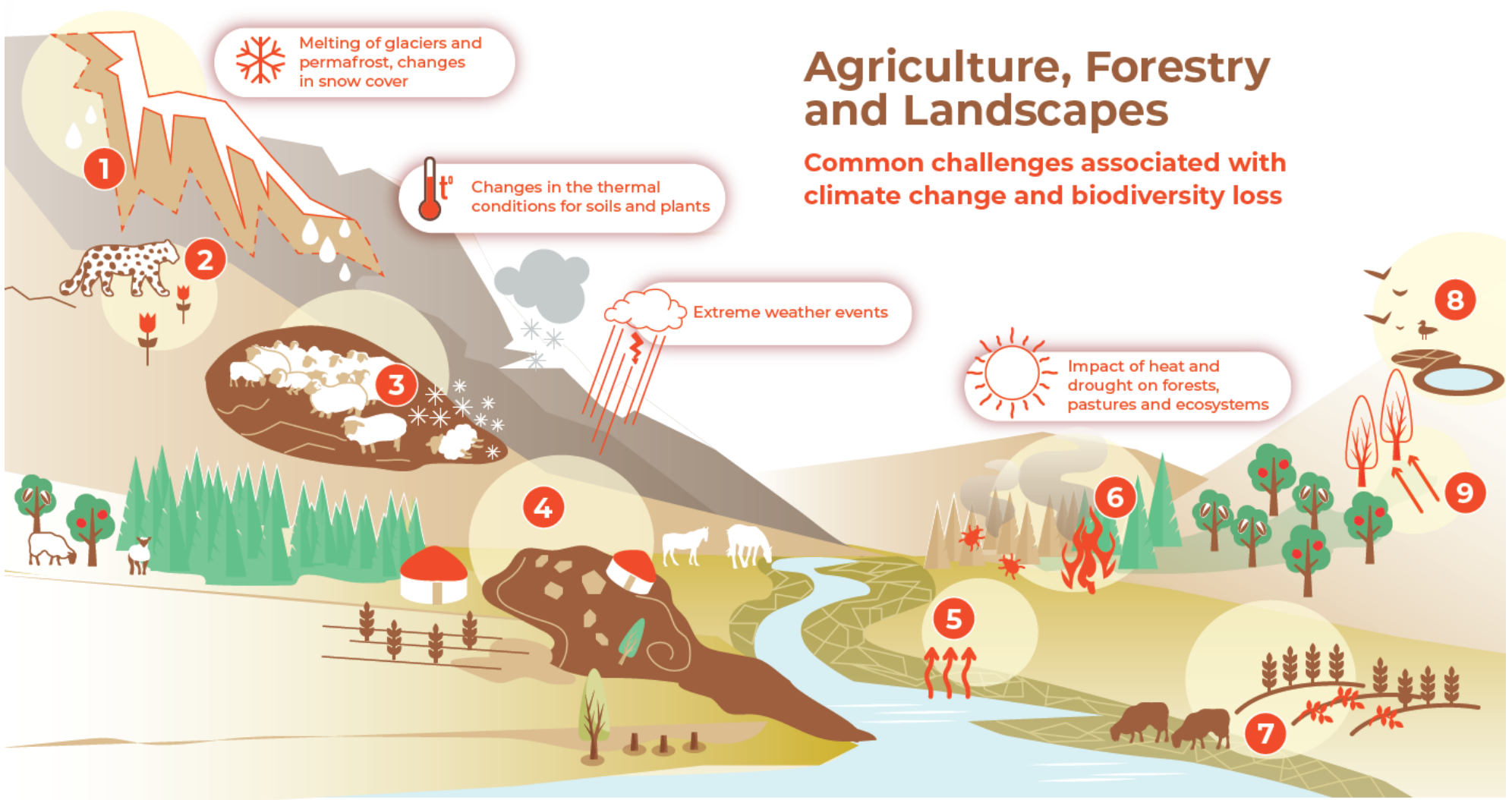
https://zoinet.org/product/cc-biodiv-kyrgyzstan/

Densely Populated and Urban Areas

Mutual benefits and synergies of climate and biodiversity measures

1. Green belts around cities
2. Energy-efficient buildings and light facades with green architectural solutions
3. Green spaces using native species
4. Urban parks, lakes and fountains
5. Incentives and conditions for public and electric transportation
6. Renewable energy and gasification
7. Wastewater treatment
8. Monitoring of water and air quality
9. National parks and eco-tourism destinations near cities. Biodiversity awareness and clean-up campaigns
10. Waste reduction and recycling

https://zoinet.org/product/cc-biodiv-kyrgyzstan/



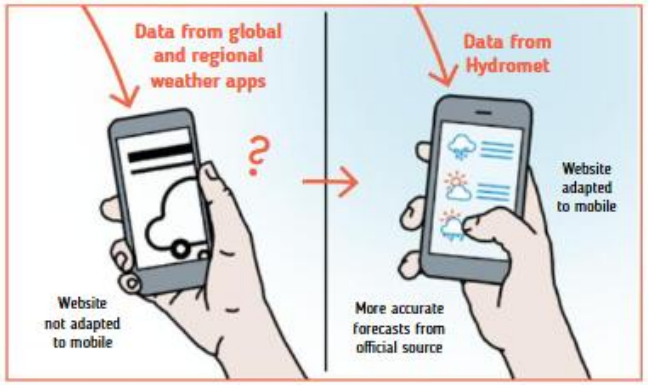
Agriculture, Forestry and Landscapes

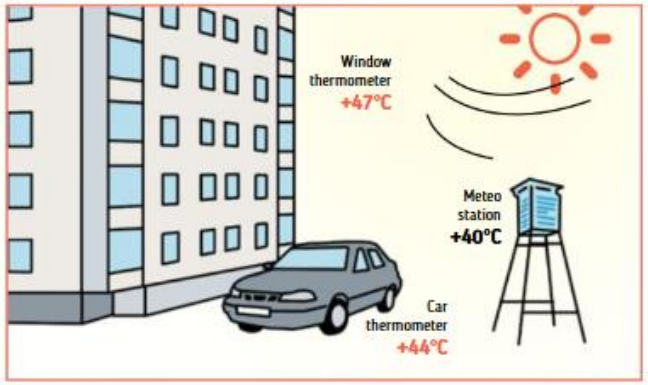
Common challenges associated with climate change and biodiversity loss

1. Reduction of glacier area, changes in high-mountain landscapes
2. Changes in the conditions and habitats of flora and fauna species
3. Pasture degradation due to intensive grazing, livestock deaths due to lack of forage, and extreme weather events
4. Extreme weather events can cause landslides and mudflows, especially when forests and pastures are degraded and slopes are used for farming
5. Impact of heat and drought on water resources and aquatic species and ecosystems
6. Deterioration of forests and an increased risk of fires due to pests, increased heat, and drought
7. Food insecurity
8. The impact of climate change and land development on migratory species, sites of species aggregation and wildlife habitats
9. Degradation and shifting of forests due to climate warming and changes in precipitation

https://zoinet.org/product/cc-biodiv-kyrgyzstan/

https://zoinet.org/product/cc-biodiv-kyrgyzstan/





Weather formation in Central Asia

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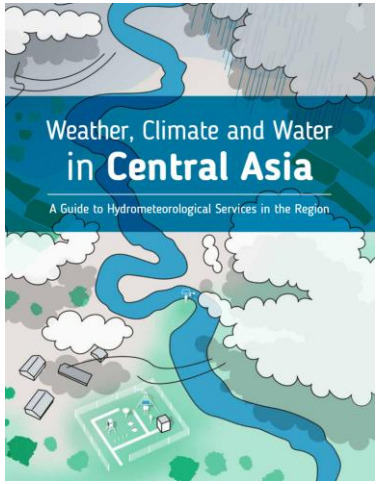

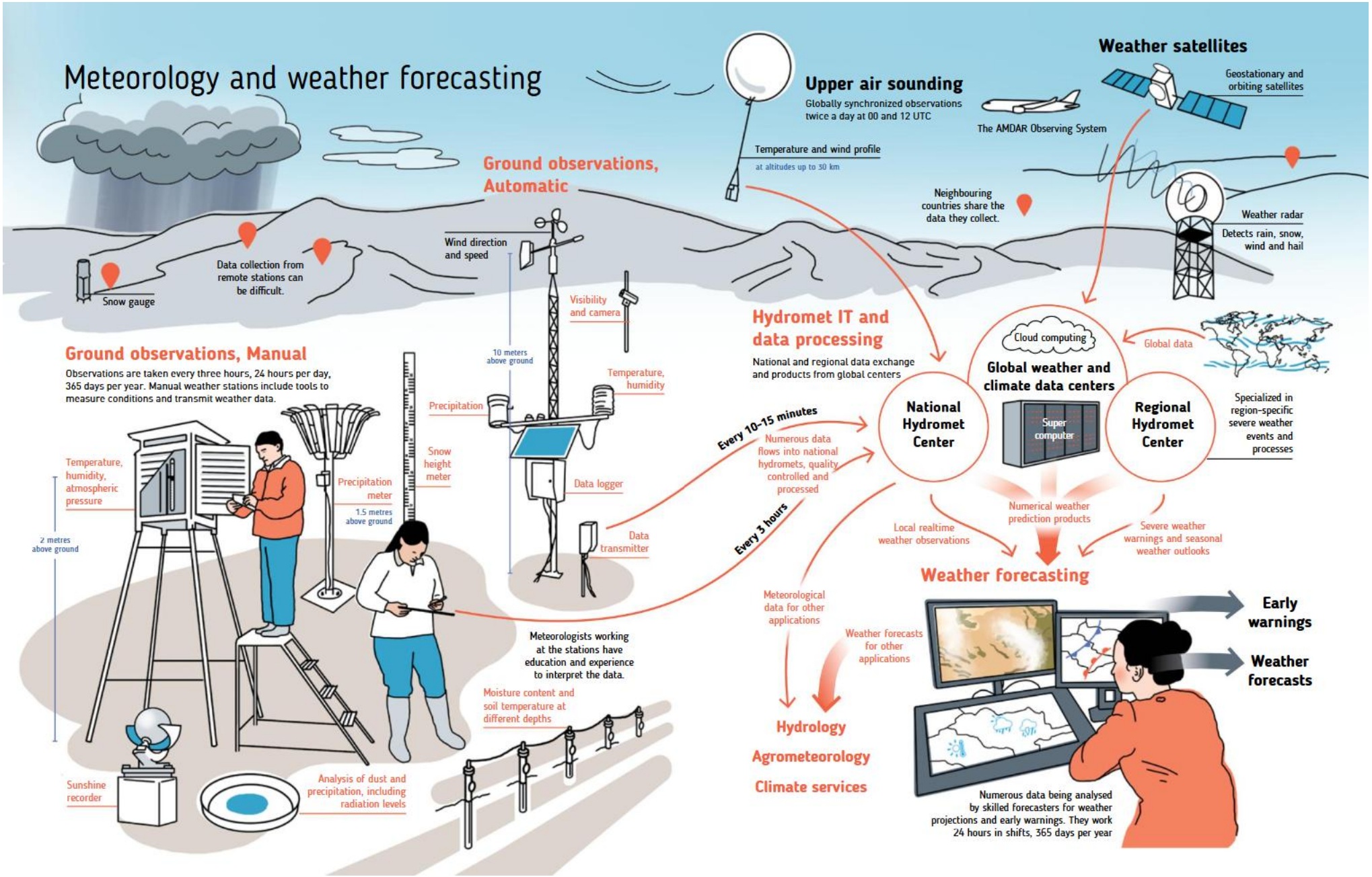

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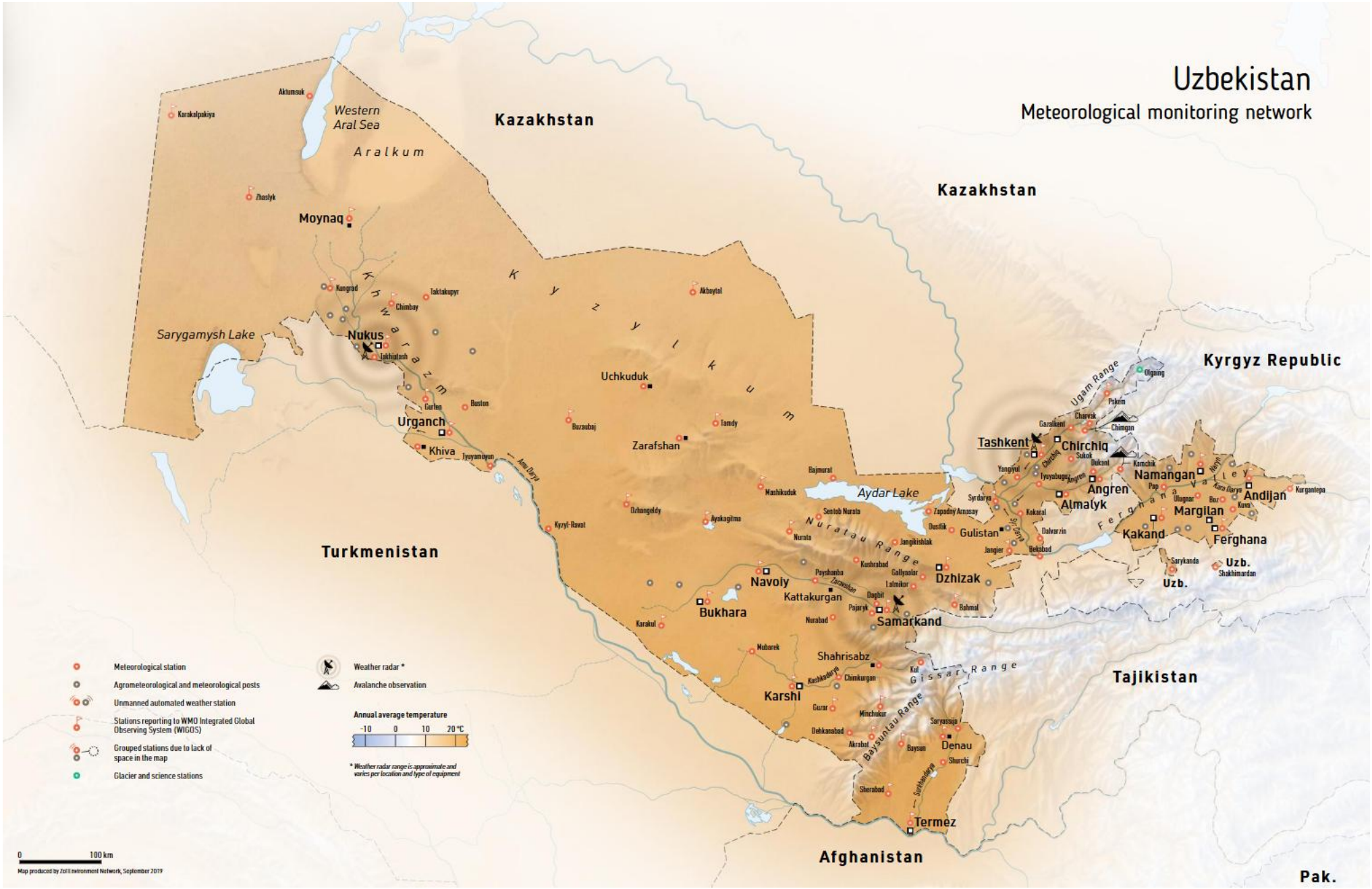
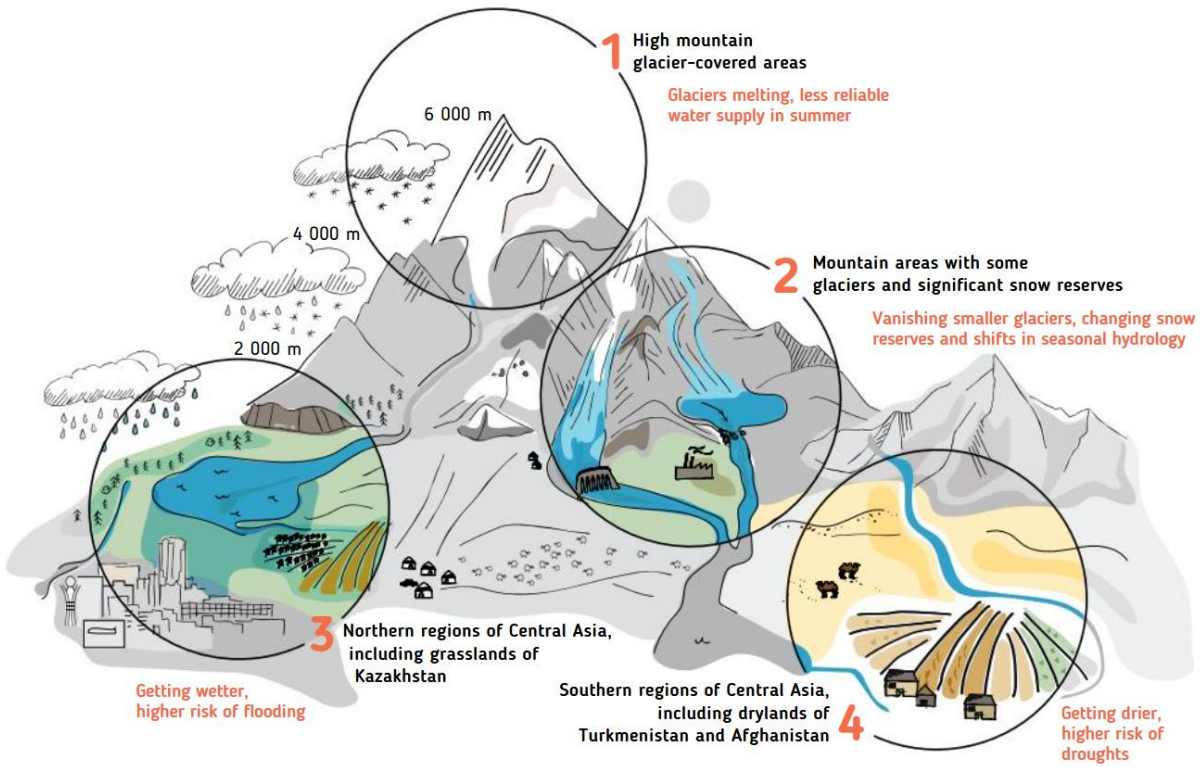


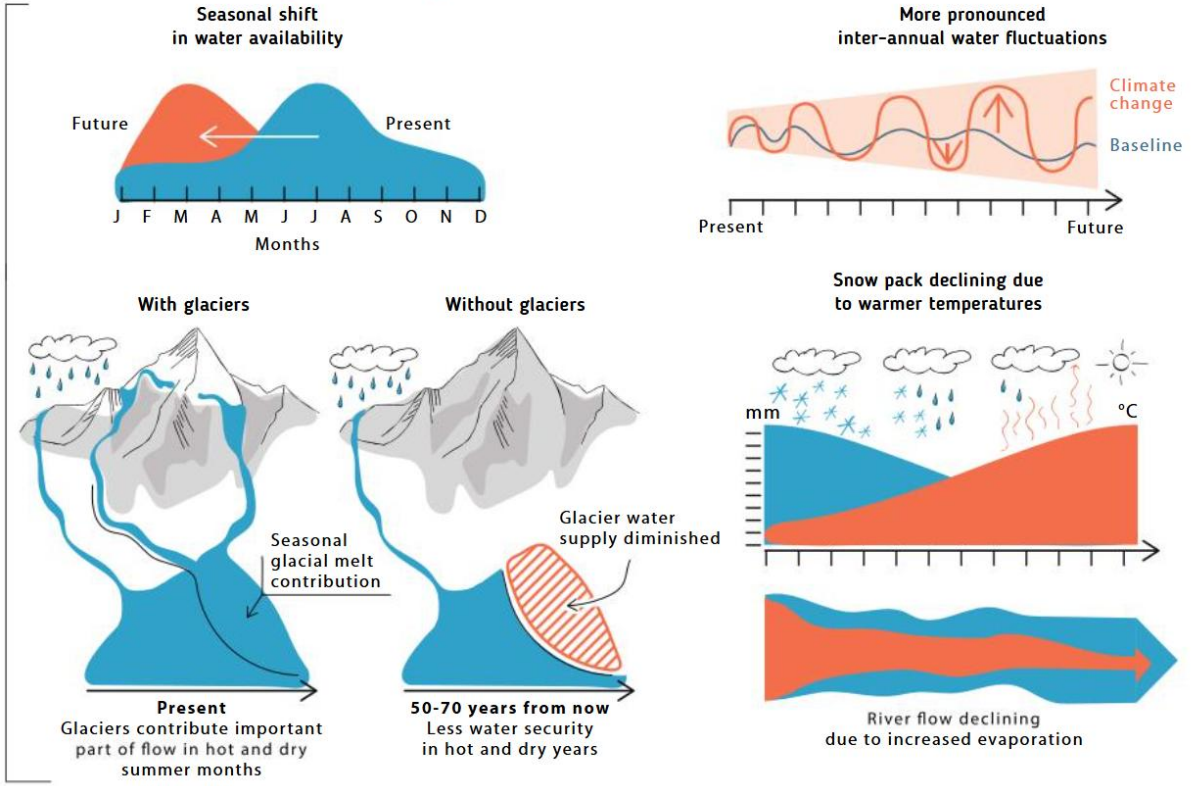
https://zoinet.org/product/hydromet-atlas/

Climate change impacts on water resources



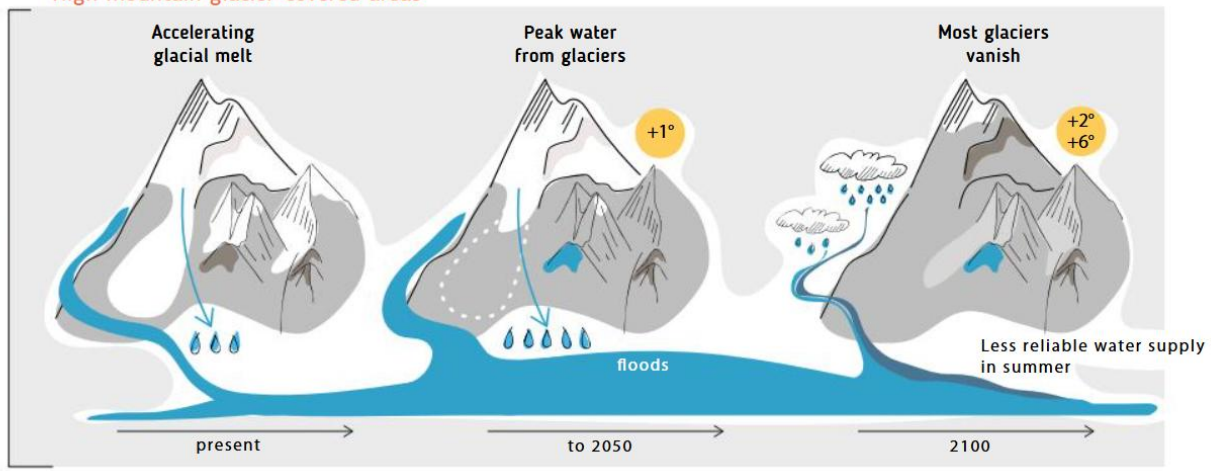
Mountain areas with some glaciers and significant snow reserves

2



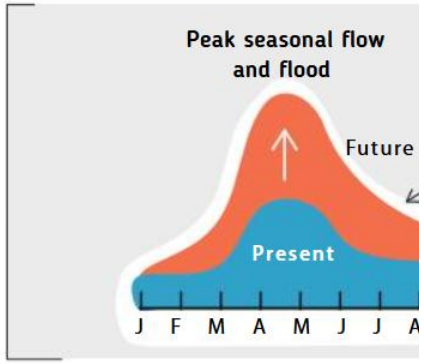
High mountain glacier-covered areas

1



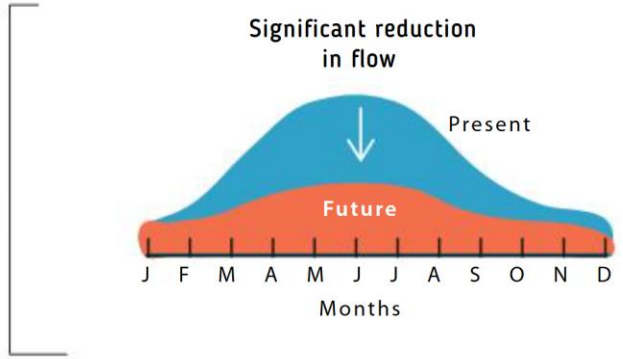
Northern regions of Central Asia,

3



Southern regions of Central Asia, including drylands of Turkmenistan and Afghanistan

4



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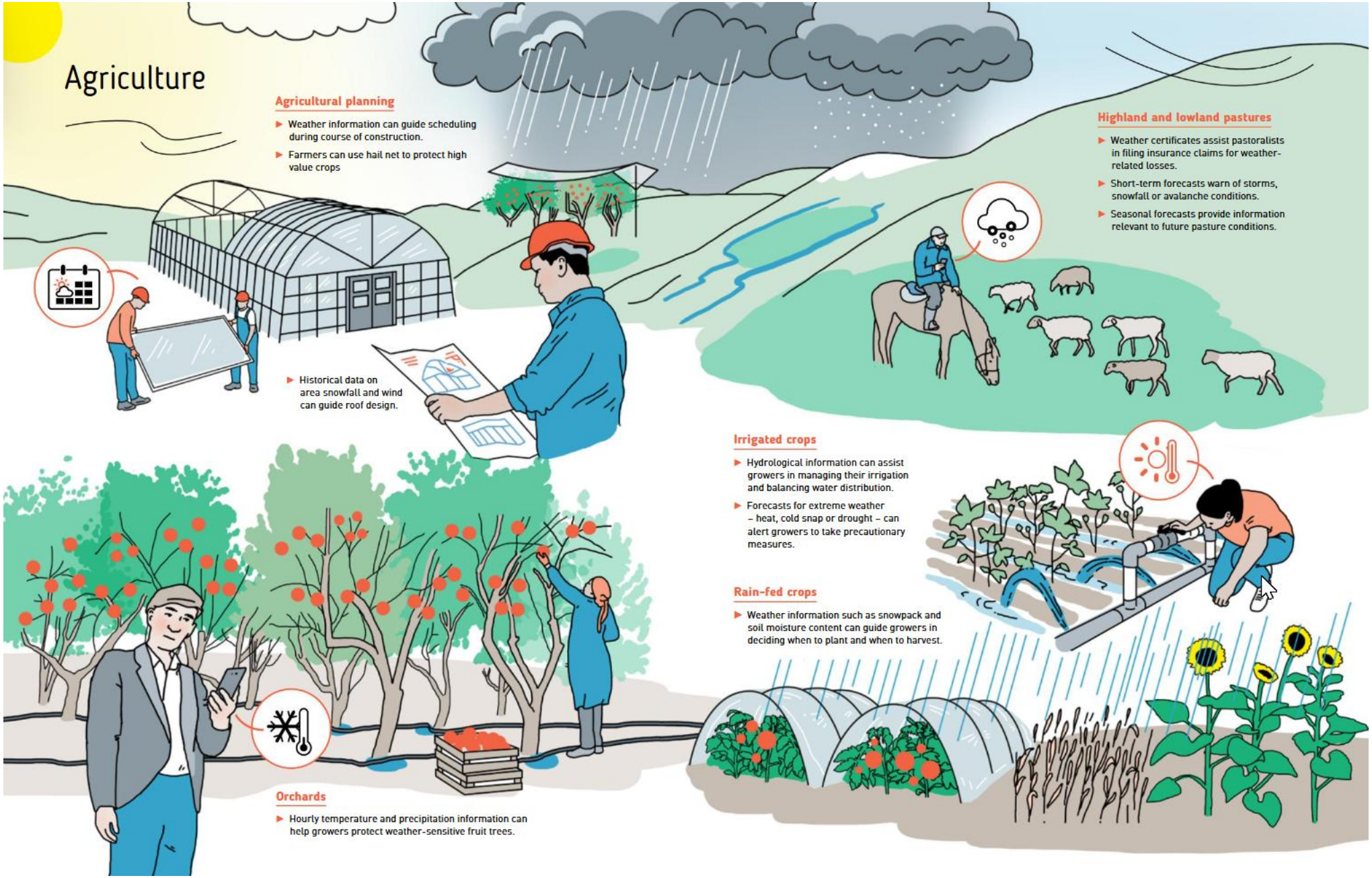

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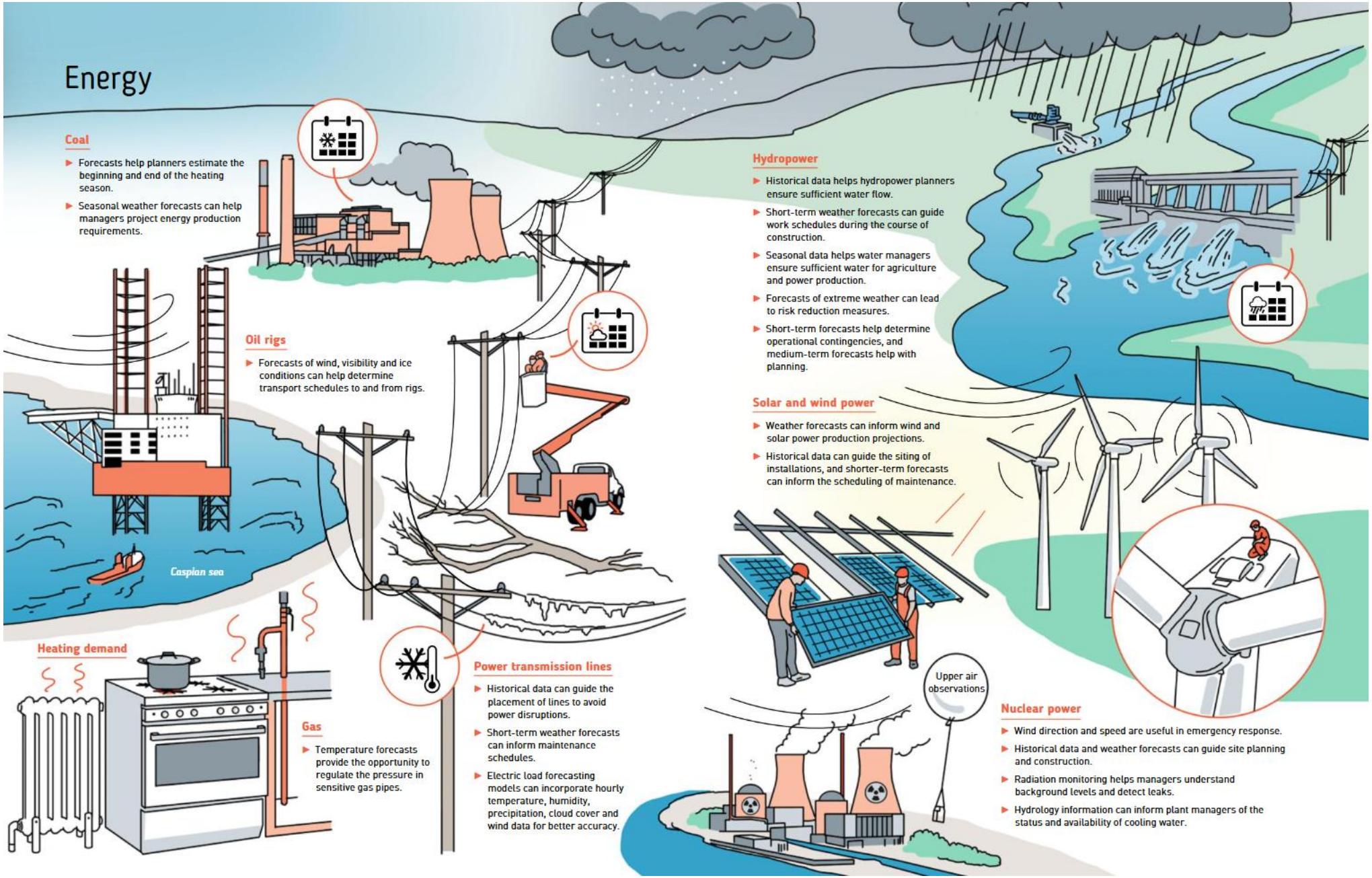

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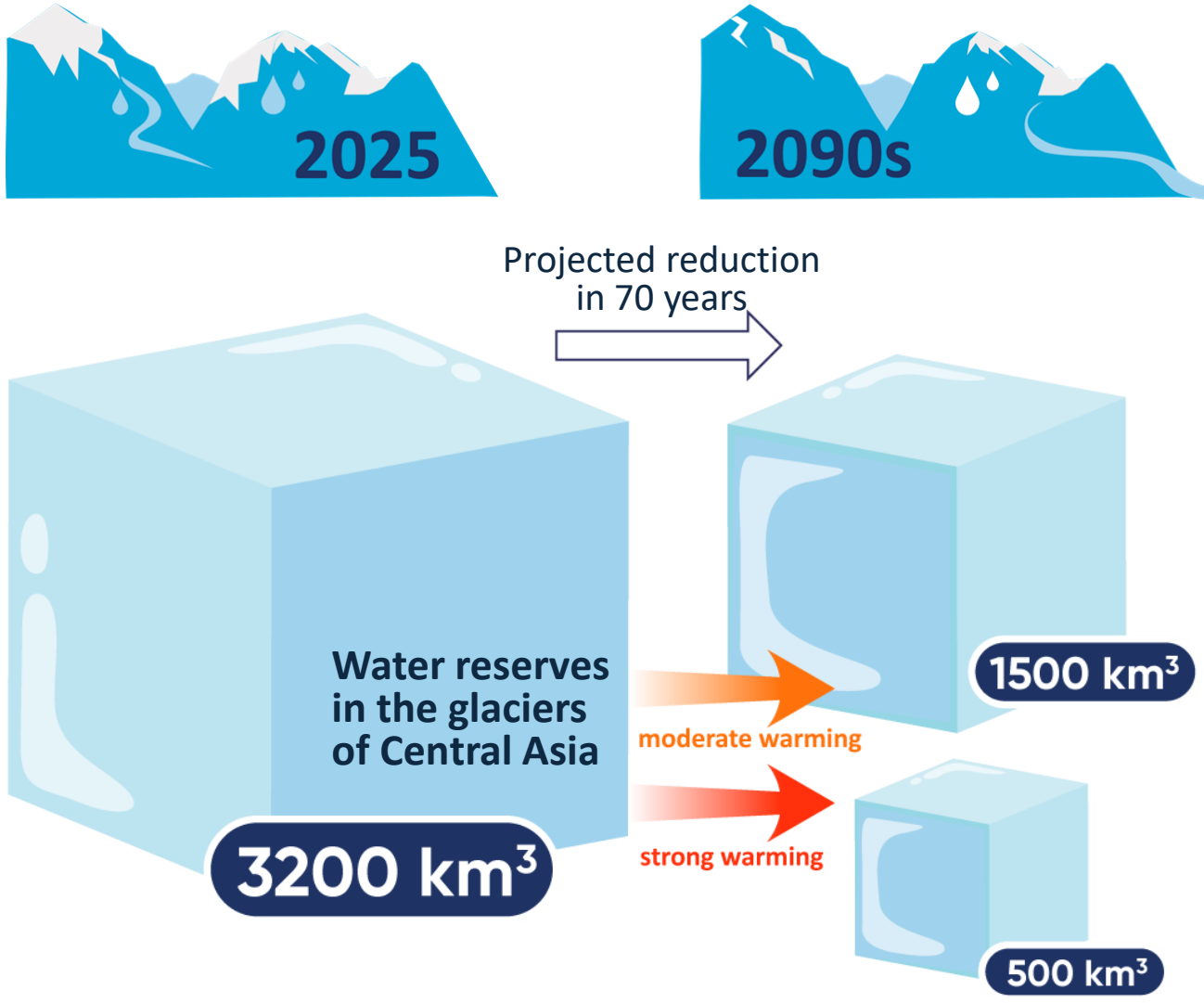
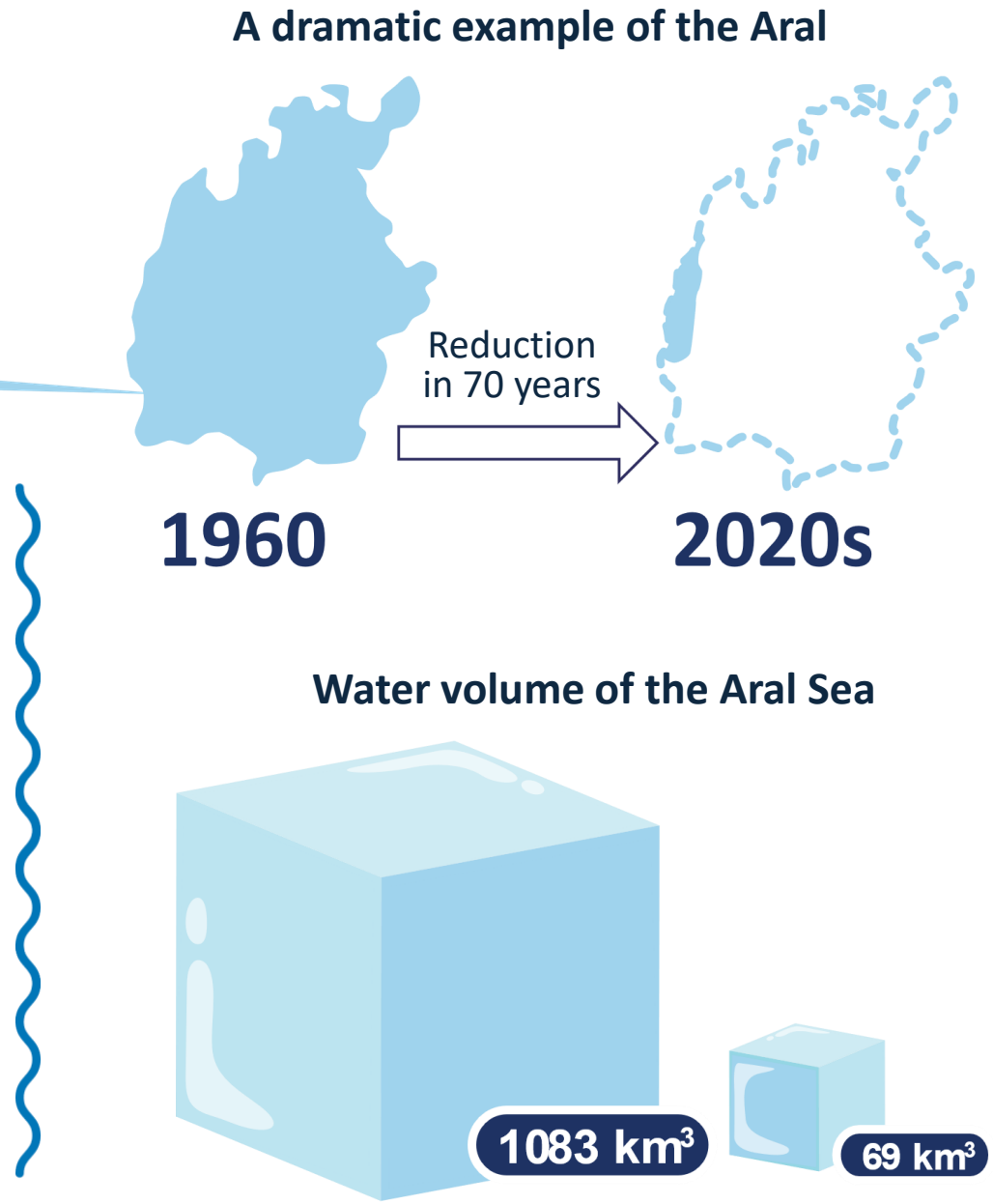
Scenarios for glaciers



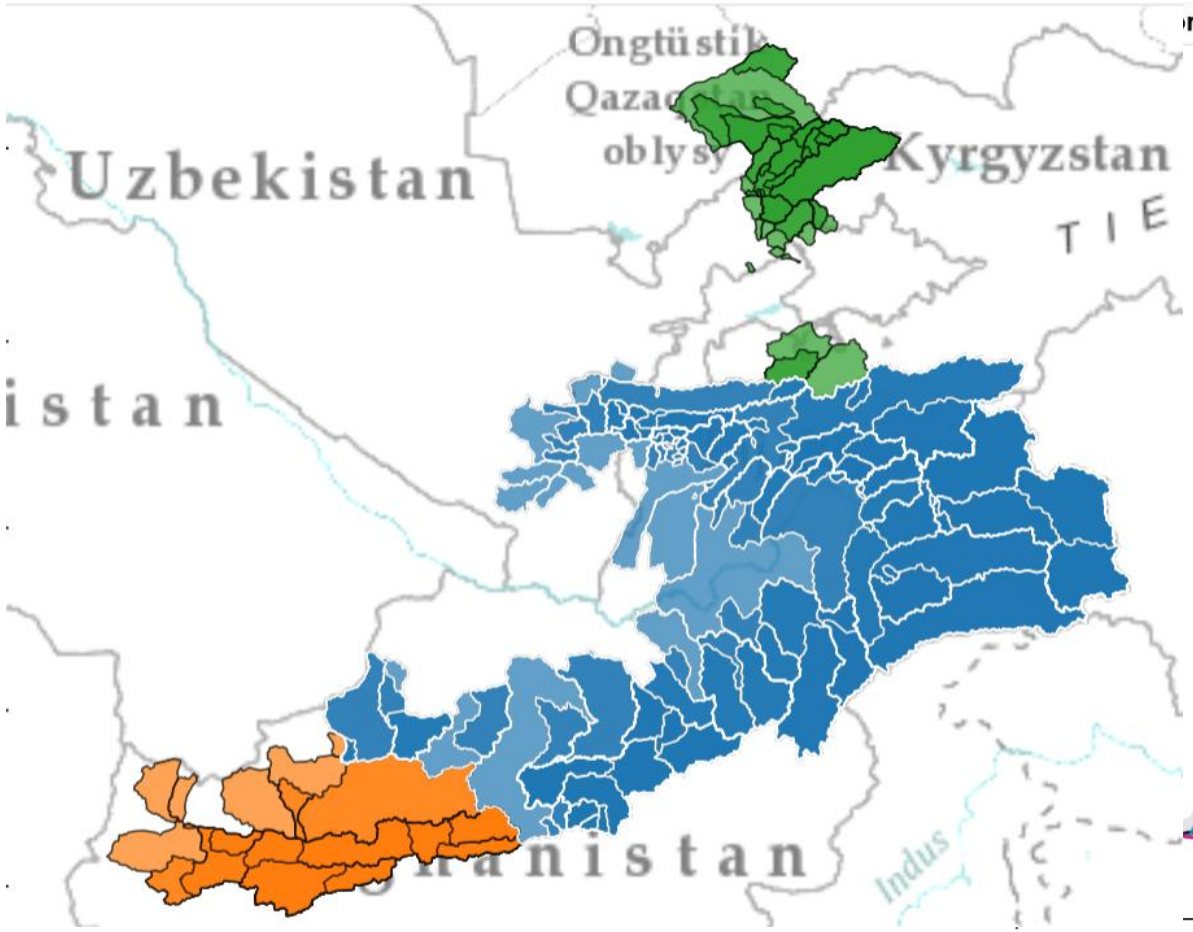


https://zoinet.org/product/ca-cryosphere-information-services/

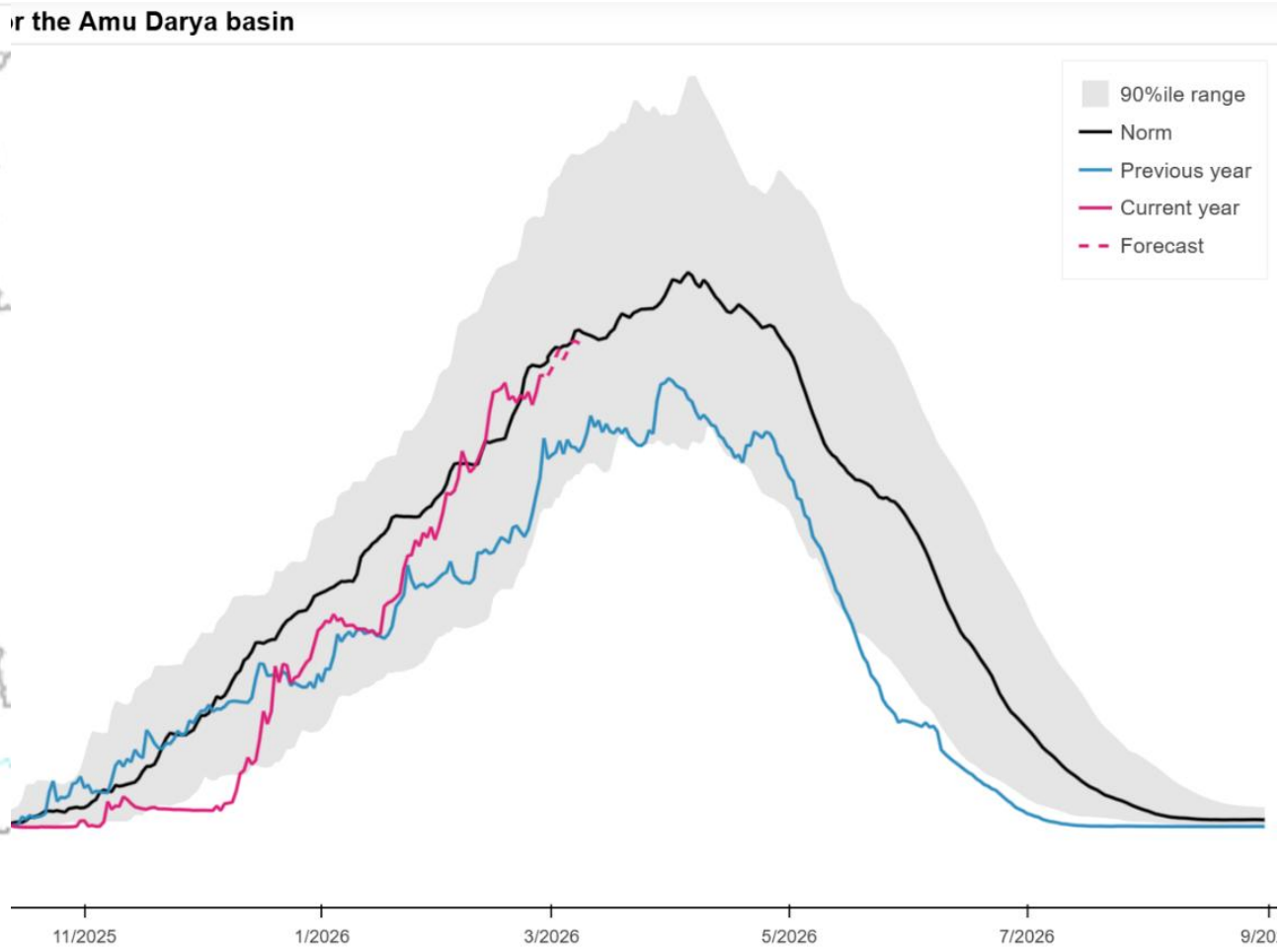
https://cryosphereca.org/

Snow Situation in Mountainous Central Asia

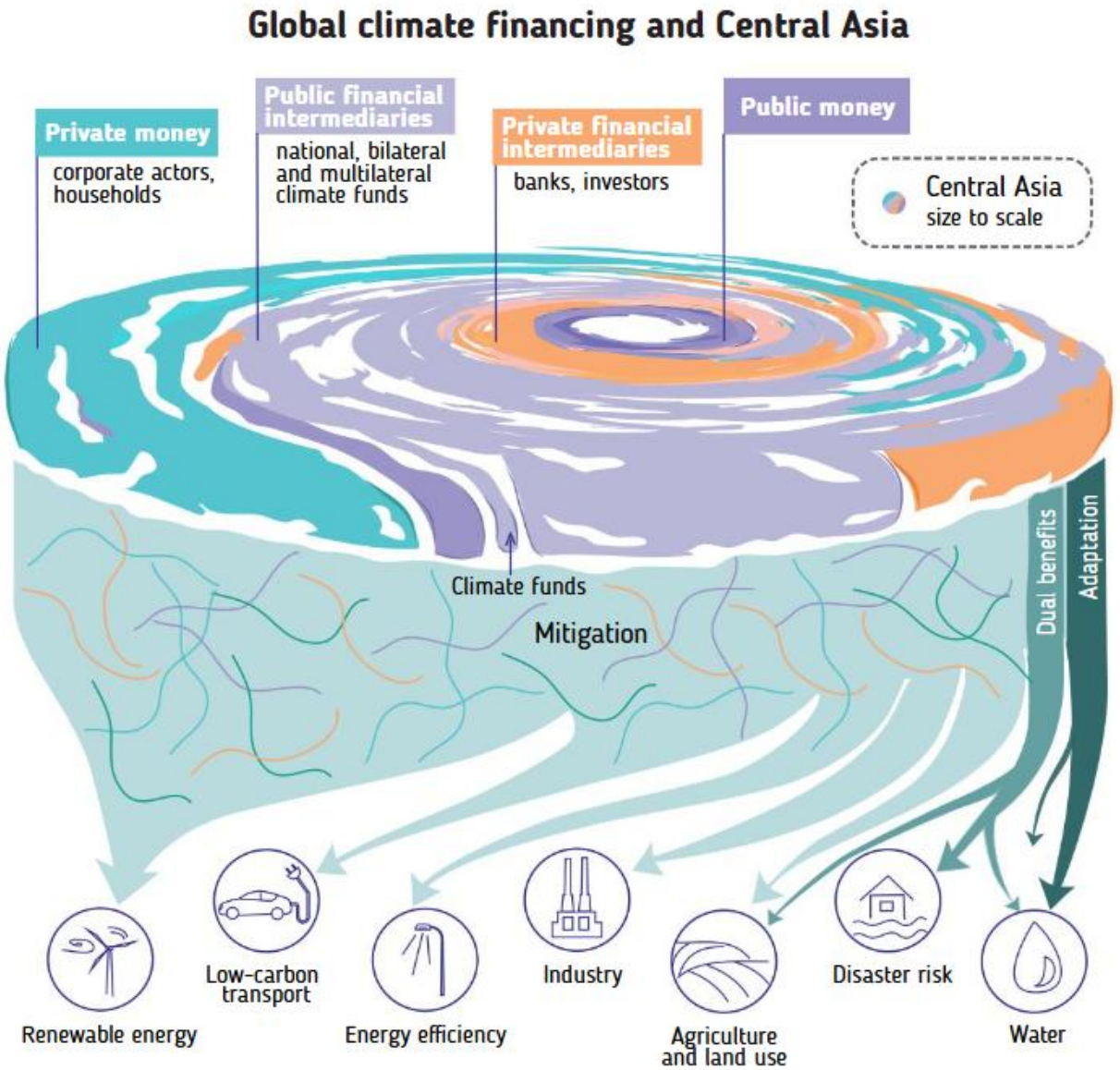
Regional river basins

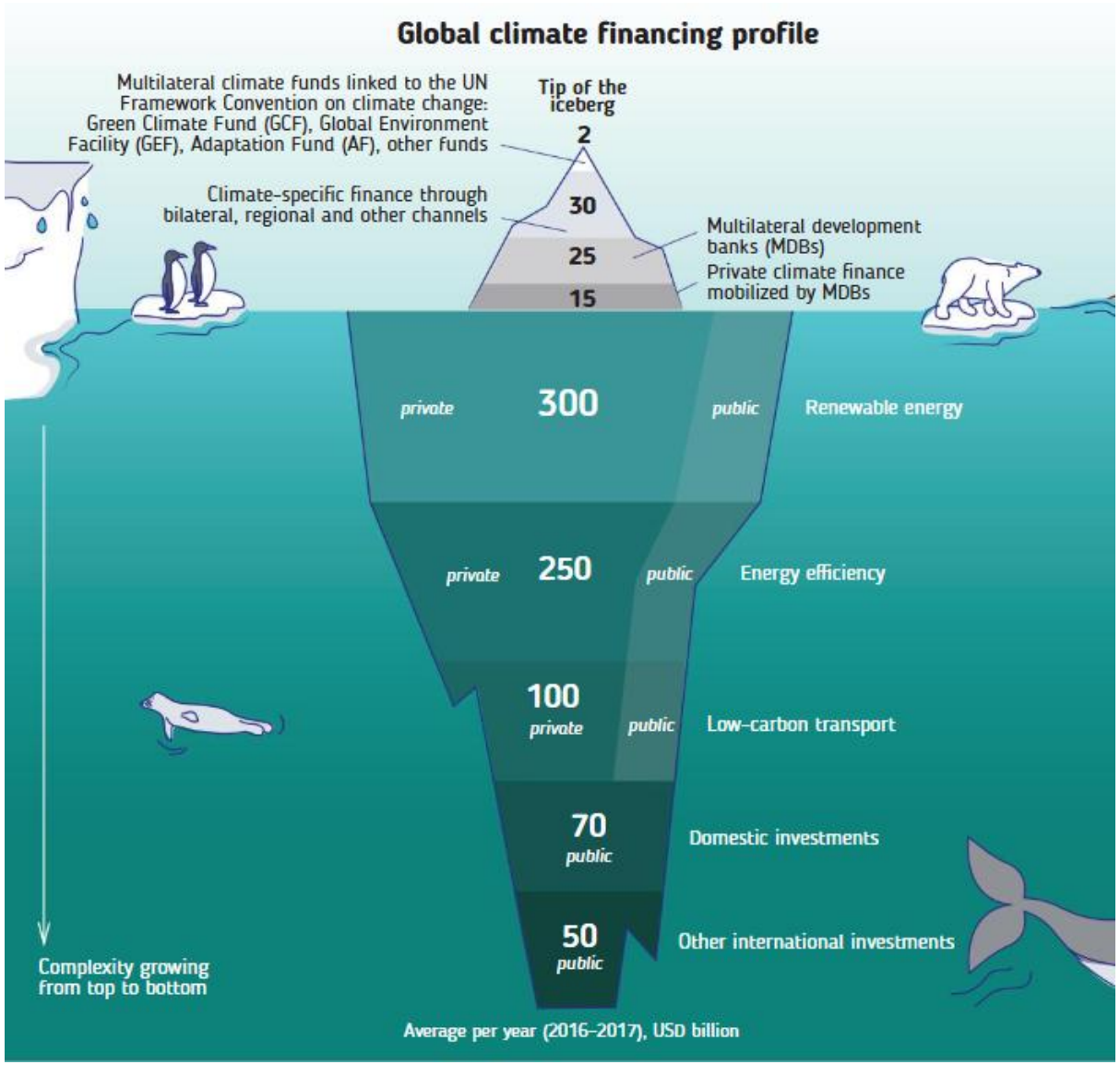


r the Amu Darya basin

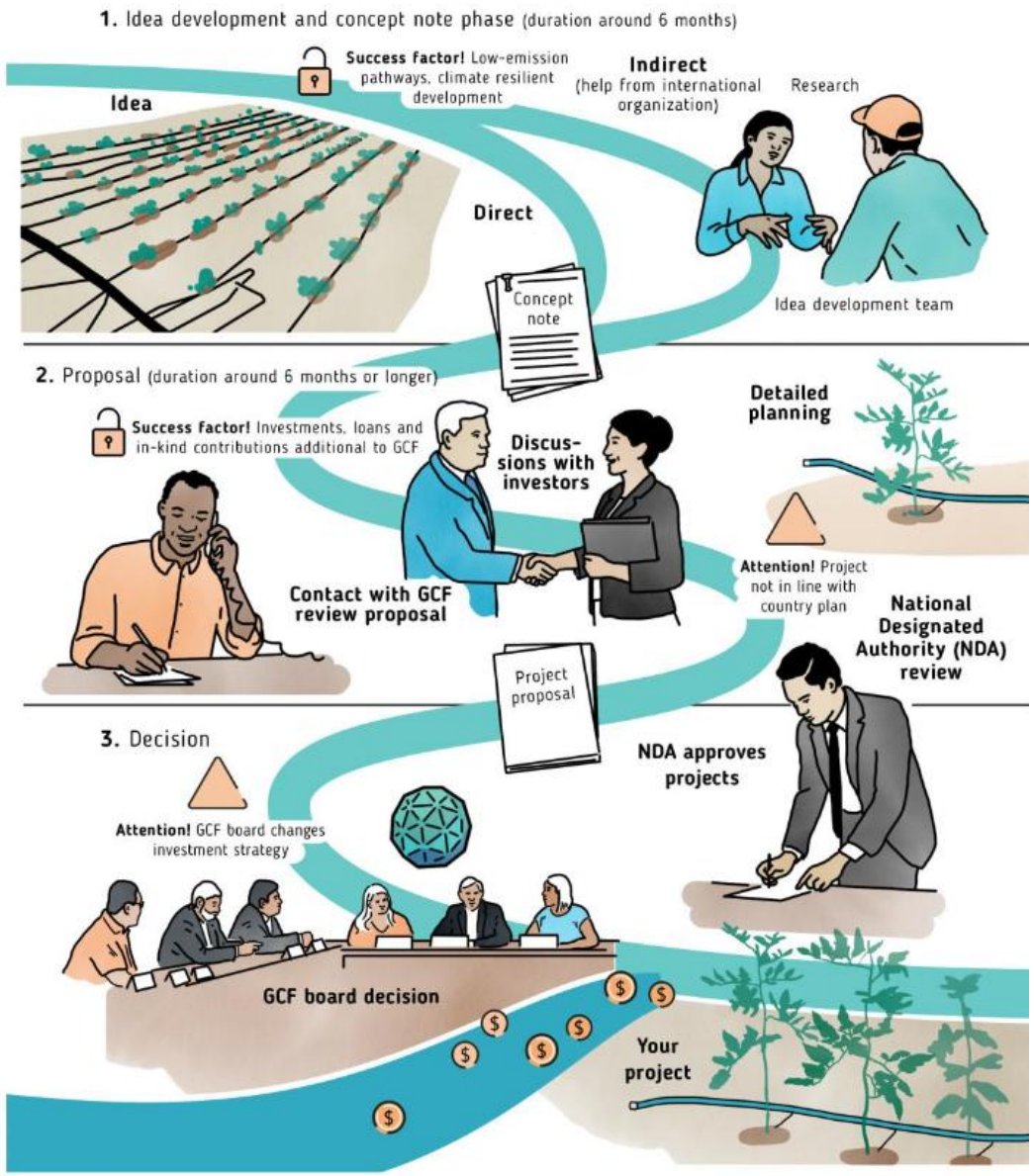


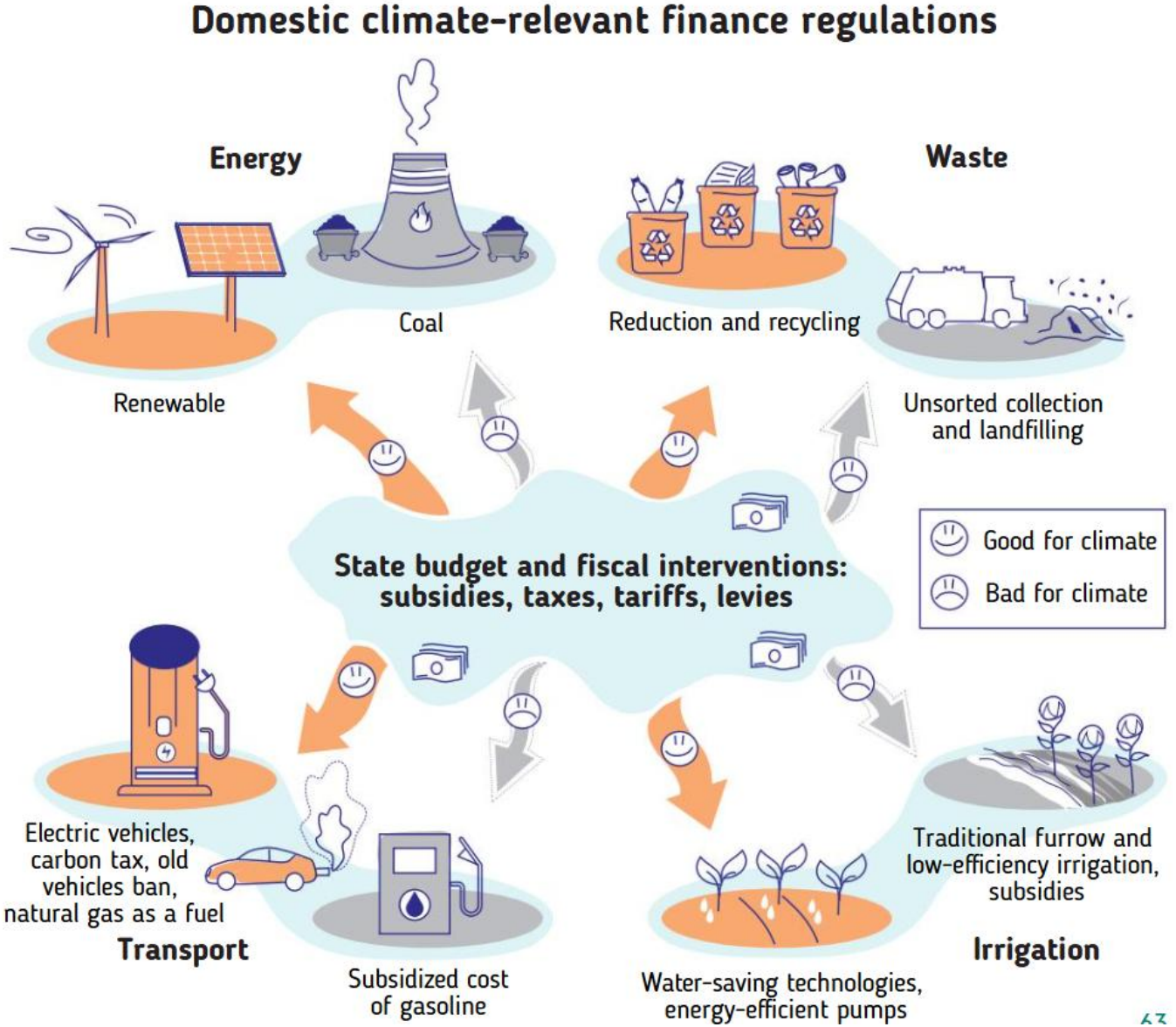
https://snowmapper.ch/





https://zoinet.org/product/financing-climate-actions-ca/





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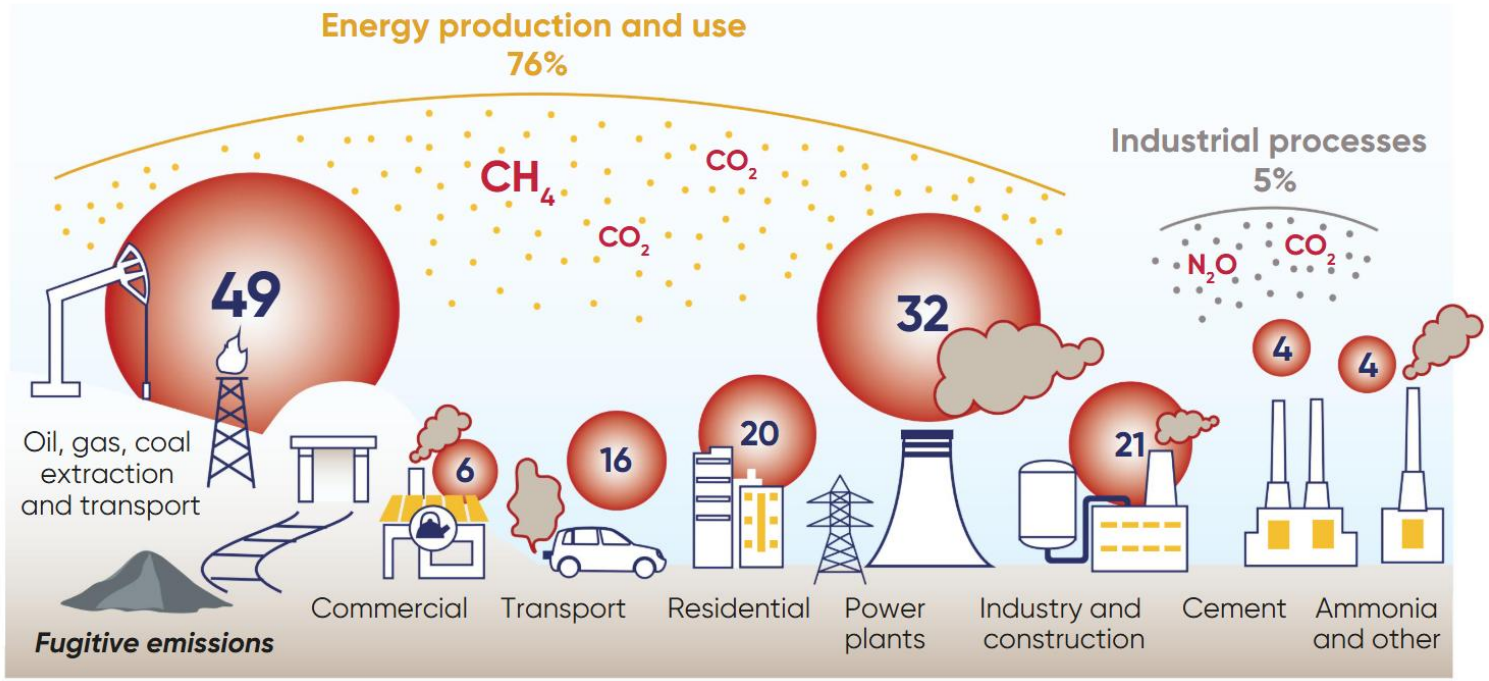
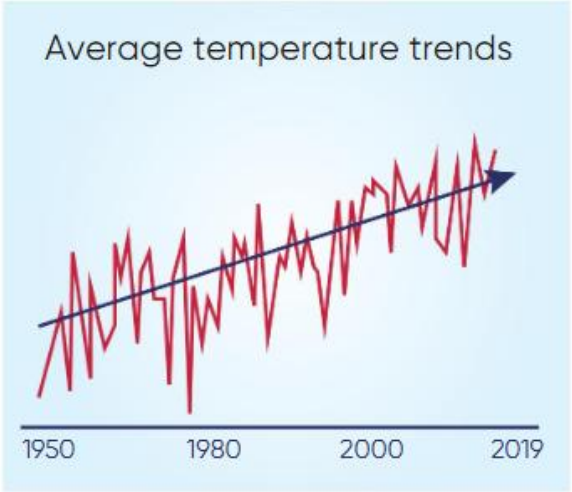
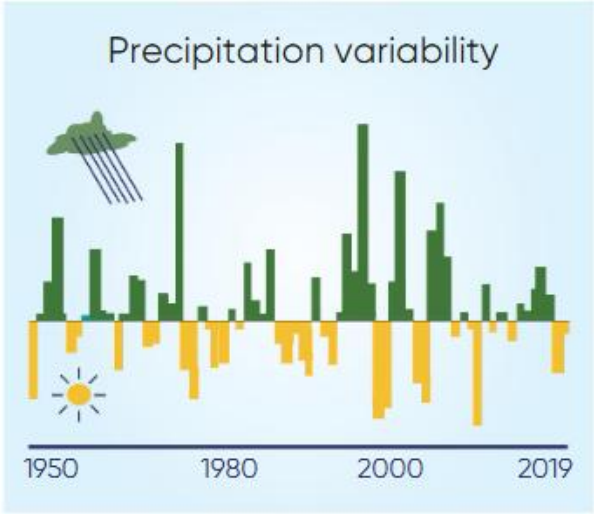
Uzbekistan GHG emissions



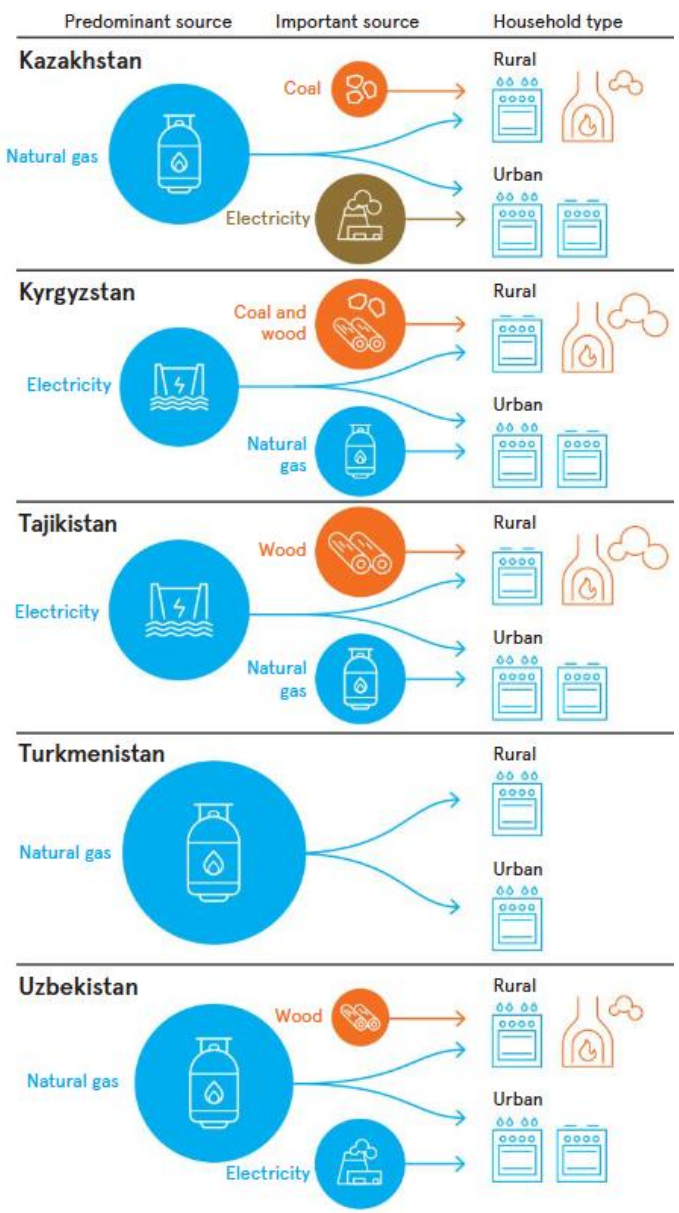
Uzbekistan climate change trends

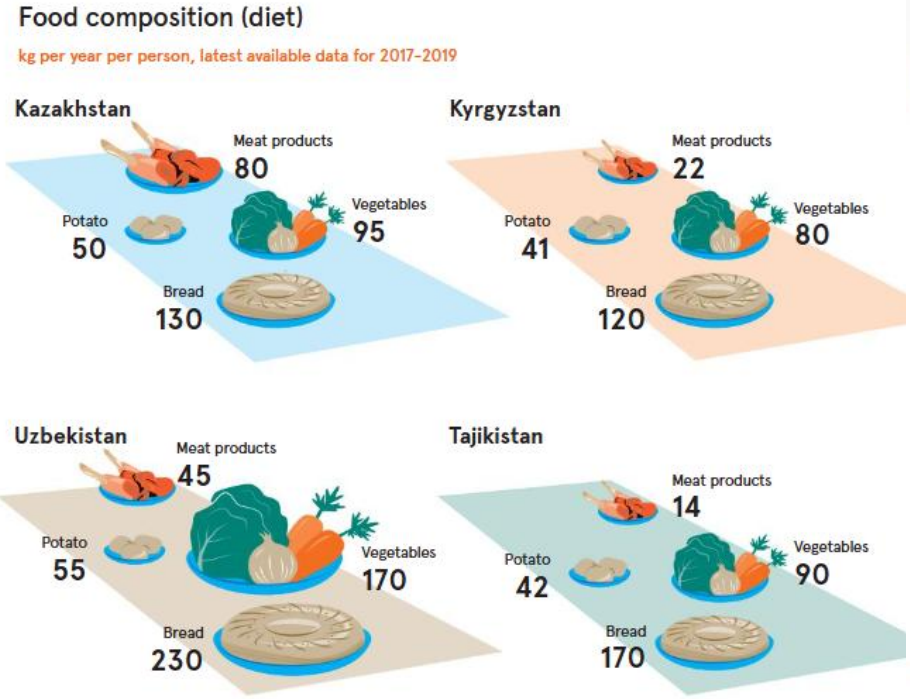


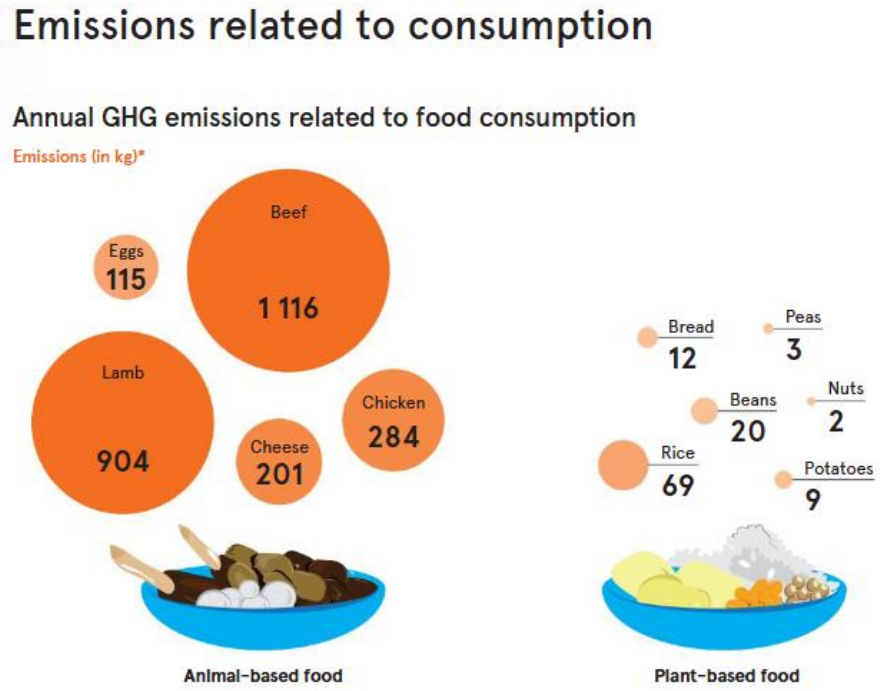


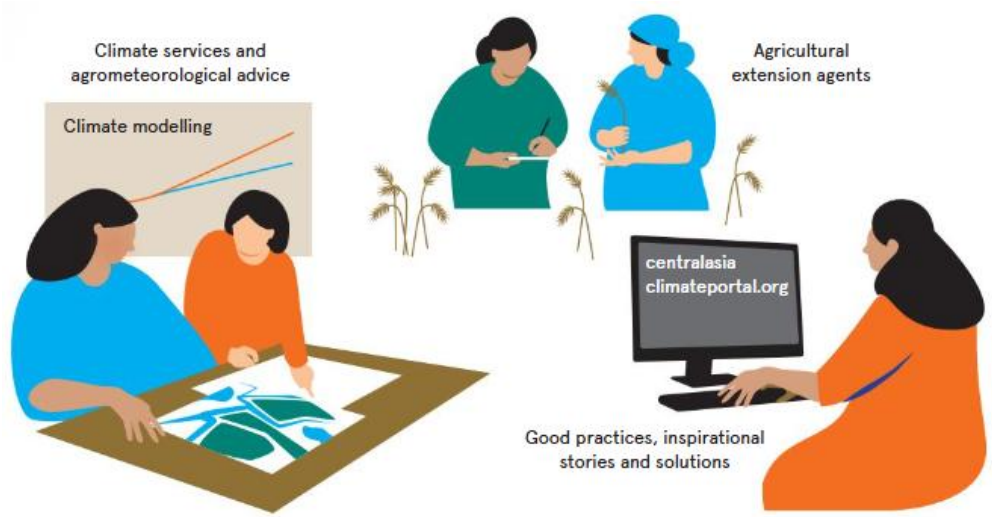
https://zoinet.org/product/uzb-soe/

https://zoinet.org/product/ca-climate-2020/







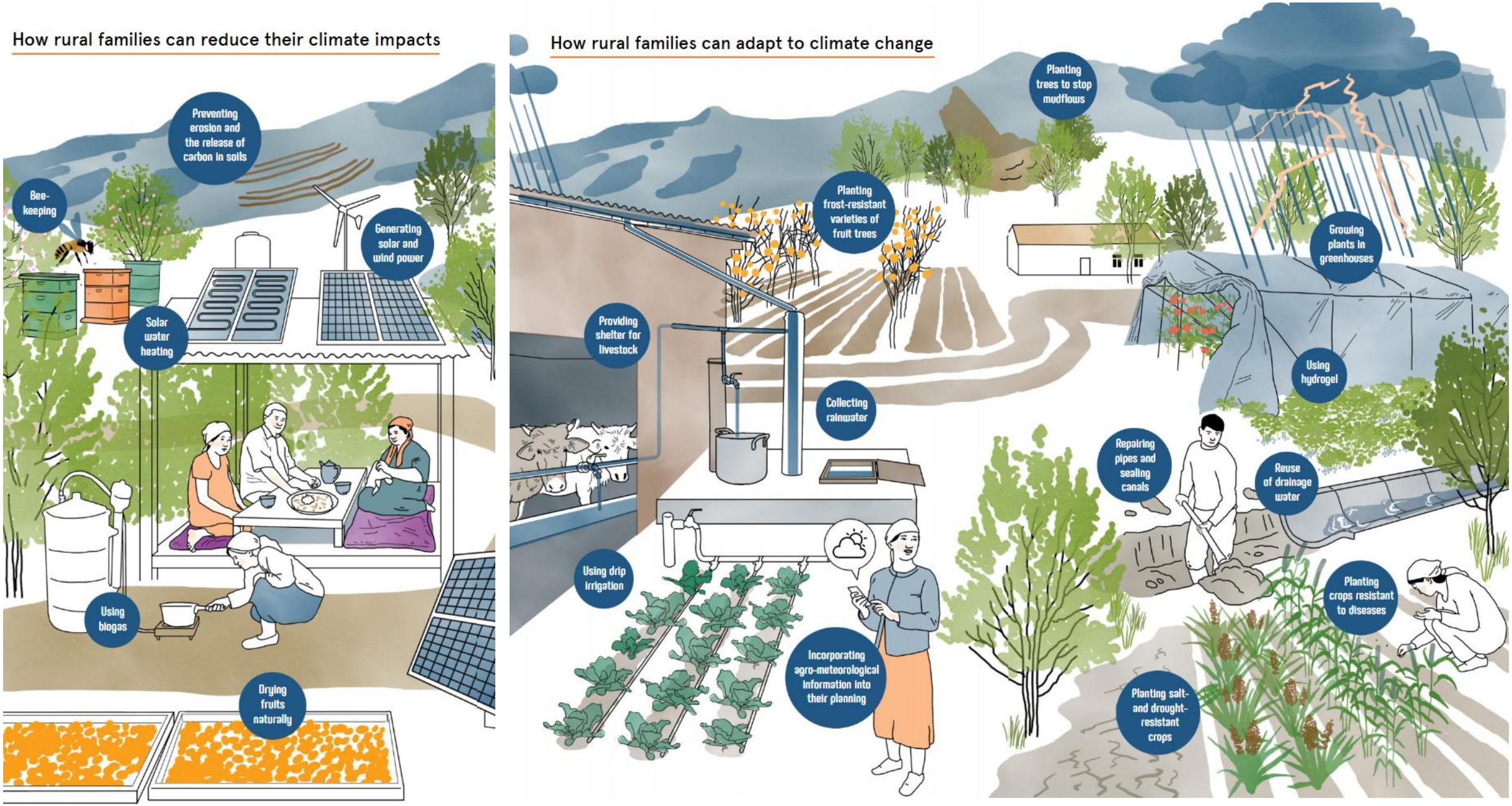


https://zoinet.org/product/women-food-climate-ca/

Climate-friendly and energy-saving approaches in an urban kitchen

Climate-friendly and energy-saving approaches in a rural kitchen

https://zoinet.org/product/women-food-climate-ca/



https://zoinet.org/product/climate-investments-ca/

CAMP4ASB
Climate Adaptation & Mitigation Program for Aral Sea Basin
CENTRAL ASIA

THE WORLD BANK

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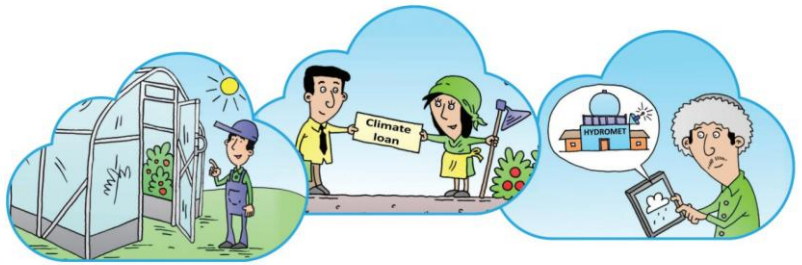
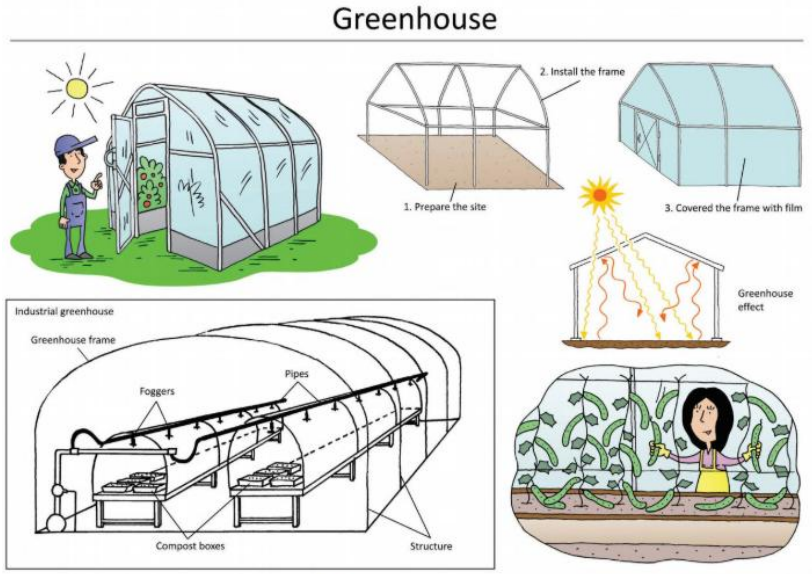
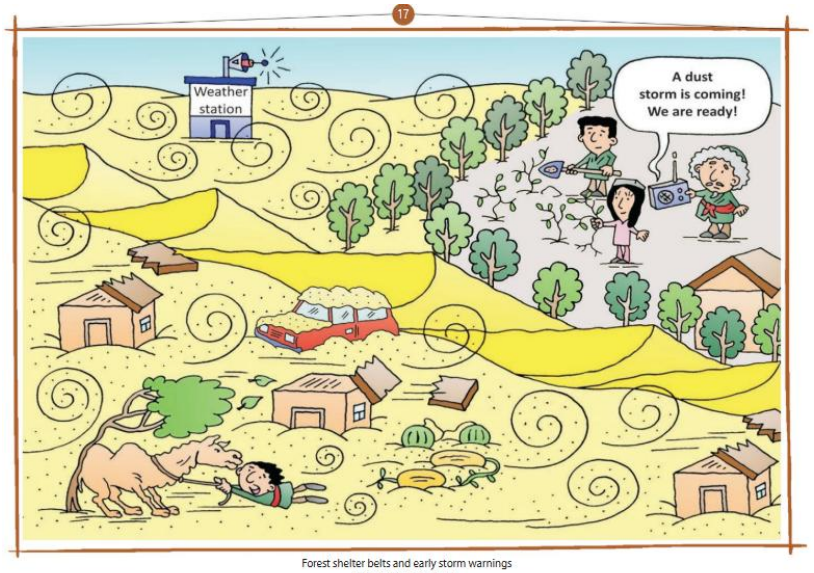
Green technologies and climate information: application guide in cartoons





Backyard or professional greenhouses reduce the impacts of adverse weather, and can grow crops almost year-round.



Forest shelter belts and early storm warnings reduce storm damage.

https://zoinet.org/product/green-technologies-cartoons/

https://zoinet.org/product/ru-tj-hydromet-glossary/