CAREC Region's Climate Vulnerabilities: Policy Options for a Sustainable Future

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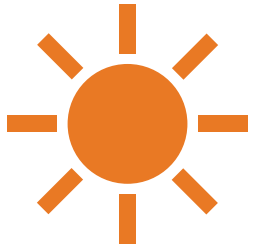
CAREC region: Climate challenge

Temperature increase ~3-7^{o}C at end of 21st century compared to 1981-2010



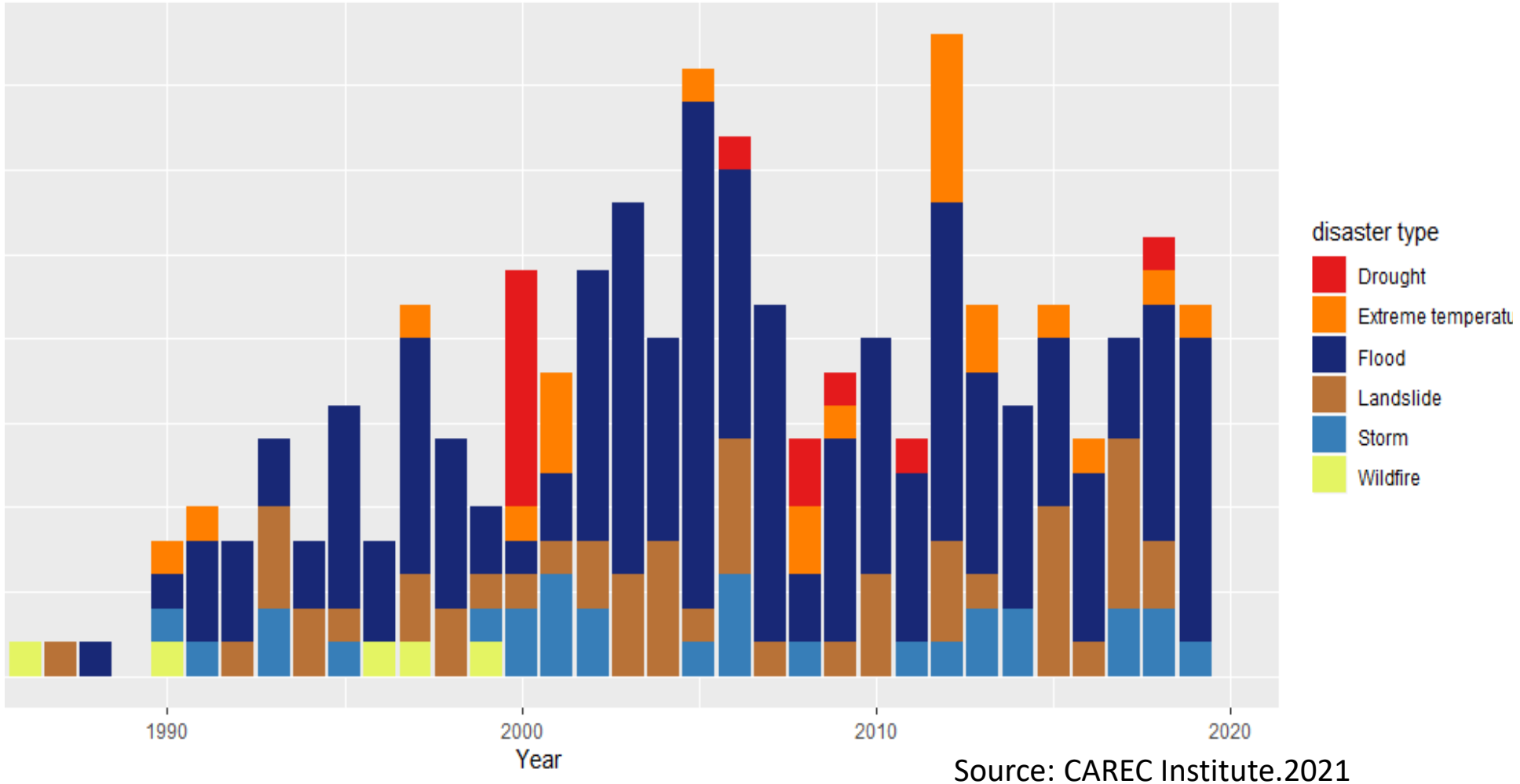
Increase in heat days (>35°C) up to 80 days more per year in the plains

Slight to strong increase in total precipitation depending climate scenario
General increase in extreme precipitation (~20-30% increase in maximum 1 day precipitation)

Increase in drought in the plains, up to +30 drought days per year. Sharp contrast between the mountains (TAJ, KGZ, south KAZ) where drought indicator decreases

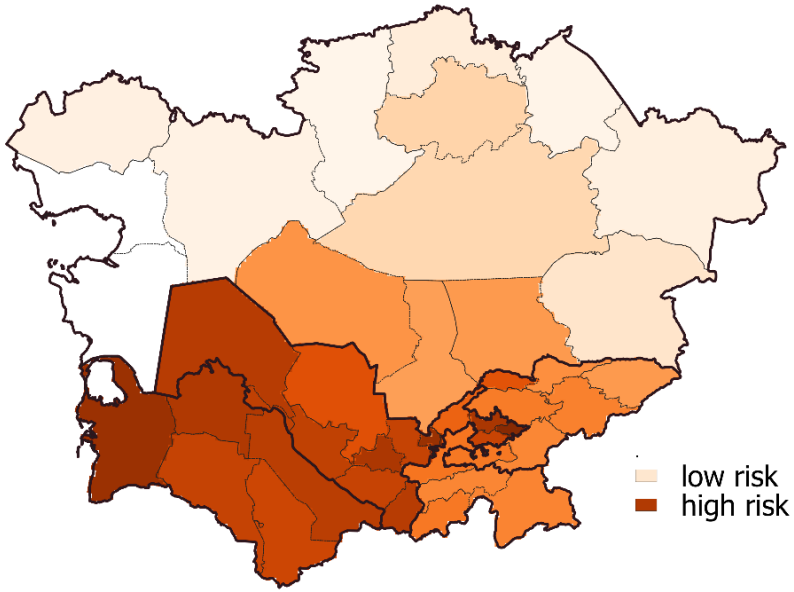
Source: CAREC Institute.2024

CAREC region: Climate Challenge

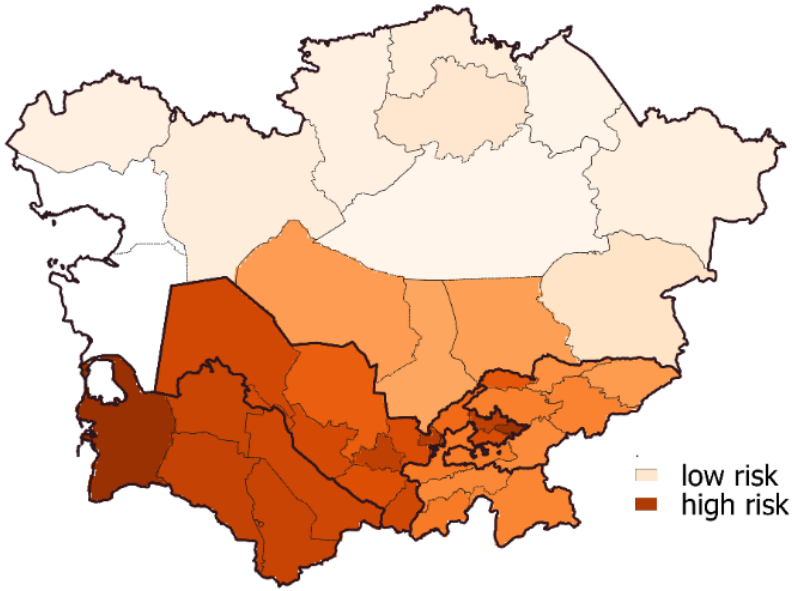


Source: CAREC Institute.2021

CAREC region: Climate Challenges



A. Optimistic



B. Pessimistic

Source: CAREC Institute.2021

CAREC region: Climate Challenges

severe decline in agricultural productivity in lower Amu Darya and Syr Darya, irrigated land – out of use

cropping and animal losses in Kazakhstan, Uzbekistan and Turkmenistan. Drinking water deficit, energy problems

a severe **shortage of drinking water and household uses, cropping losses i**n northern parts of Uzbekistan, eastern Turkmenistan, and South Kazakhstan. Outmigration processes from the affected areas

Source: Abdullaev and Petrick. 2024

CAREC region: Climate Change impacts

Water	Agriculture	Energy	Transport	Health
• Glacier melt initially increases discharges in headwaters, towards the end of the century decline • Earlier snowmelt increases spring flows • A transition from snowfall to rainfall makes water availability more erratic • Heat increases evaporation of water (drought) and reduces water quality.	• Heat increases crop and livestock water demand and crop stress • Extreme precipitation (including hail) can cause damage to crops. • Drought decreases agricultural production. • Higher temperatures and increasing carbon fertilization may increase agricultural productivity • Geographical suitability for agriculture of high-altitude areas may increase	• Increased water temperature hampers the cooling of thermal and nuclear power stations, and more erratic flows may lead to the unavailability of cooling water • Heat reduces efficiency of the generation, transmission, and distribution of energy • Heat increases cooling demands, increasing energy demand	• More heat causes more damage to road pavement • More floods/landslides/avalanches lead to more road damage (including bridges) and railroads. • The vulnerability of road pavement to heat favors investment in railroad transport	• More heat increases heat stress for human bodies, mainly increasing respiratory and cardiovascular diseases. • Heat decreases air quality • Higher temperatures reduce drinking water quality and favor the spreading of diseases. • More frequent droughts leads to reduced drinking water availability

CAREC region: Climate Change impacts

Water	Agriculture	Energy	Transport	Health
• Heavy precipitation leads to more frequent flooding, causing damage to water and sanitation infrastructure • Drought reduces water availability • Increased sedimentation rates can lead to a lowering of storage capacity in reservoirs	• More erratic rainfall can pose problems for rainfed agriculture and make irrigation sources less reliable, or lead to more groundwater pumping • Drought may increase soil salinity • Increasing extreme precipitation can lead to waterlogging and inaccessibility of agricultural land	• A shift to a more erratic hydrological flow regime reduces the efficiency of hydropower plants • More extreme flows will increase sedimentation, lowering the lifetime of hydropower infrastructure. • More frequent floods and landslides lead to more damage to energy generation and distribution infrastructure	• Higher drainage capacities to deal with more intense rainfall • More protective engineering structures to protect infrastructure from landslides, rockfalls, avalanches, flooding	• Improve cooling in homes and public spaces • Improve health care

CAREC region: Climate Challenge

Central Asian countries exhibited much **higher rates of temperature growth** compared to the global averages over the past hundred years

Central Asia reported an increasing frequency of adverse **natural disasters** of a wide spectrum

Magnitude of future **rise of temperature and shifts in the precipitation patterns** in the region will likely exceed the scale of the observed historical changes

Climatic change in the region will cause **significant changes in annual volume and seasonal patterns** of rivers` run-off

CAREC region: Climate Vulnerability

	Exposure	Sensitivity	Adaptive capacity	Index
Afghanistan	1,20	0,48	0,14	4,14
Azerbaijan	1,40	0,40	0,70	0,80
China	1,00	0,14	0,88	0,16
Georgia	1,40	0,06	0,81	0,11
Kazakhstan	1,00	0,21	1,31	0,16
Kyrgyzstan	1,00	0,22	0,87	0,25
Mongolia	0,83	0,04	0,39	0,08
Pakistan	1,00	0,72	0,27	2,65
Tajikistan	1,00	0,31	0,67	0,47
Turkmenistan	1,20	0,90	0,31	3,52
Uzbekistan	1,20	0,87	0,28	3,71

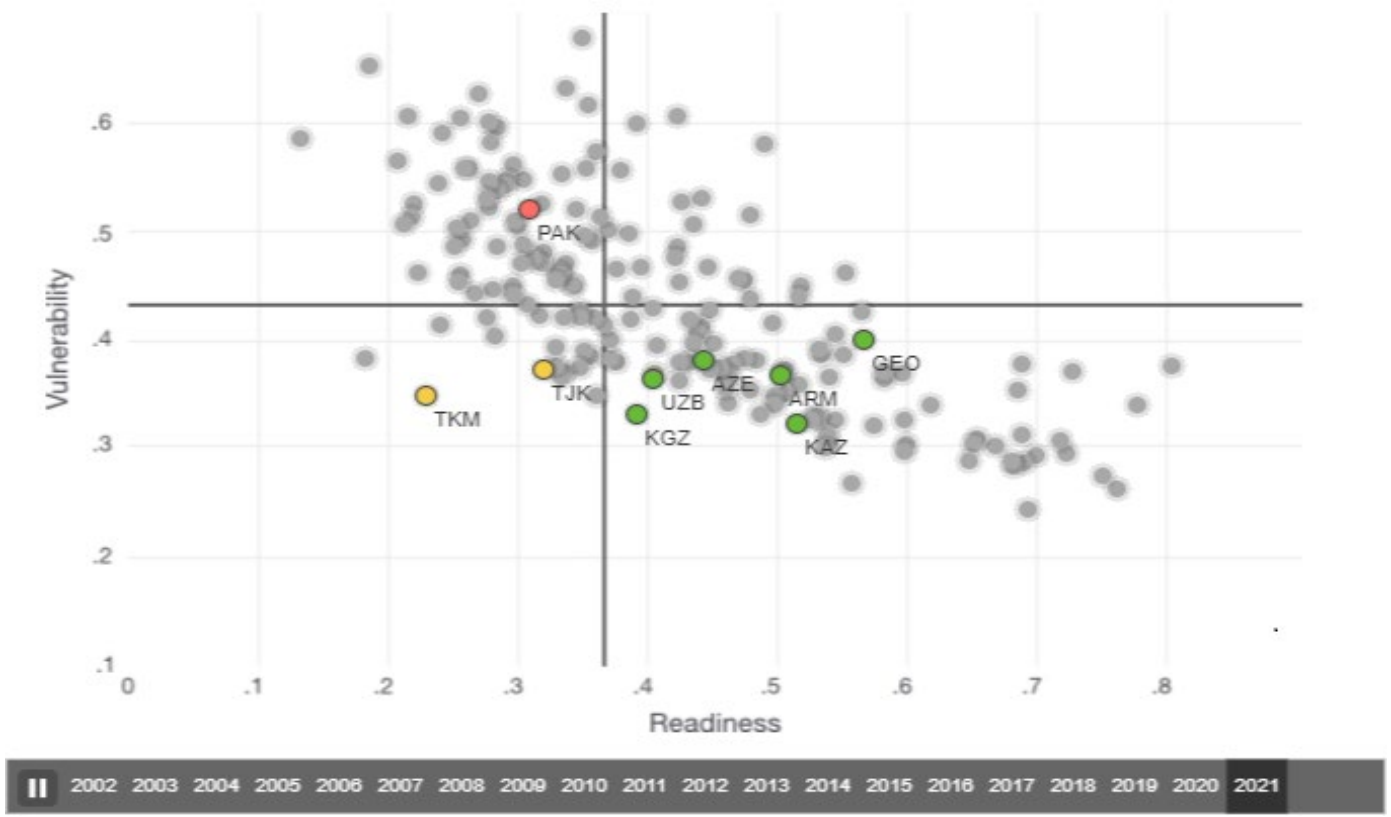
high risk

moderate risk

low risk

Source: CAREC Institute.2021

CAREC region: Climate Vulnerability



- ✓ Countries with a **high level of vulnerability** to climate change but a low level of readiness.
- ✓ These countries have both **a great need for investment and innovation** to improve readiness and an excellent urgency for adaptation action
- ✓ Countries with **a low level of vulnerability to climate change and a low level of readiness** facing relatively fewer challenges from climate change but lesser ability to take ín investment
- ✓ Countries with **low levels of vulnerability to climate change and a high level of readiness** are well-positioned to adapt. Though less vulnerable, the countries still face some adaptation challenges

Source: ND-GAIN Index 2021.

CAREC region: Climate Challenges

- ✓ CAREC countries exhibited much **higher rates of temperature growth** compared to the global averages over the past hundred years
- ✓ The countries of CAREC region reported an increasing frequency of the adverse **natural disasters** of a wide spectrum
- ✓ Magnitude of future **rise of temperature and shifts in the precipitation patterns** in CAREC region will likely exceed the scale of the observed historical changes
- ✓ Climatic changes in the region will cause **significant changes in annual volume and seasonal patterns** of rivers` run-off
- ✓ Decreased runoff and higher temperatures will exacerbate the **water scarcity** already observable in the southern part of the CAREC region

CAREC region: Climate Challenges

- ✓Projected growth in temperatures, extend periods of extremely hot days coupled with changing precipitation patterns will lead to higher incidence of **drought conditio**ns for rainfed agriculture over the larger part of CAREC region

- ✓Reduced streamflow and higher demand for irrigation water will likely intensify **water shortages and crop failures** in arid and semi-arid parts of the region

- ✓The fodder base for livestock farming in the northern part of the CAREC, will be adversely affected by higher incidence of **unfavorable meteorological conditions**

- ✓Agriculture – major **sector for employment and water use in** CAREC economies

CAREC region: Climate Challenges

- ✓ Availability of **arable land and water resources** will be decreasing across all countries, except Georgia and Mongolia

- ✓ **Land degradation:** salinity and desertification will be accelerated due to drier years, and demand for electricity in agriculture will increase

- ✓ **Water productivity is lower in the** CAREC region. Wheat, rice, and cotton production have inappropriately high land and water use shares. The alternative crops could be vegetables, fruits, and nuts

- ✓ **70% of energy production in the CAREC region** is from conventional sources. Longer sunny days and wind could help to increase the share of renewables. Both share of solar energy and solar photovoltaic production is still at a nascent states in many CAREC countries

- ✓ **Greenhouse emissions** come mainly from the energy and agriculture sectors, and emissions per GDP in the CAREC region are higher than the global average.

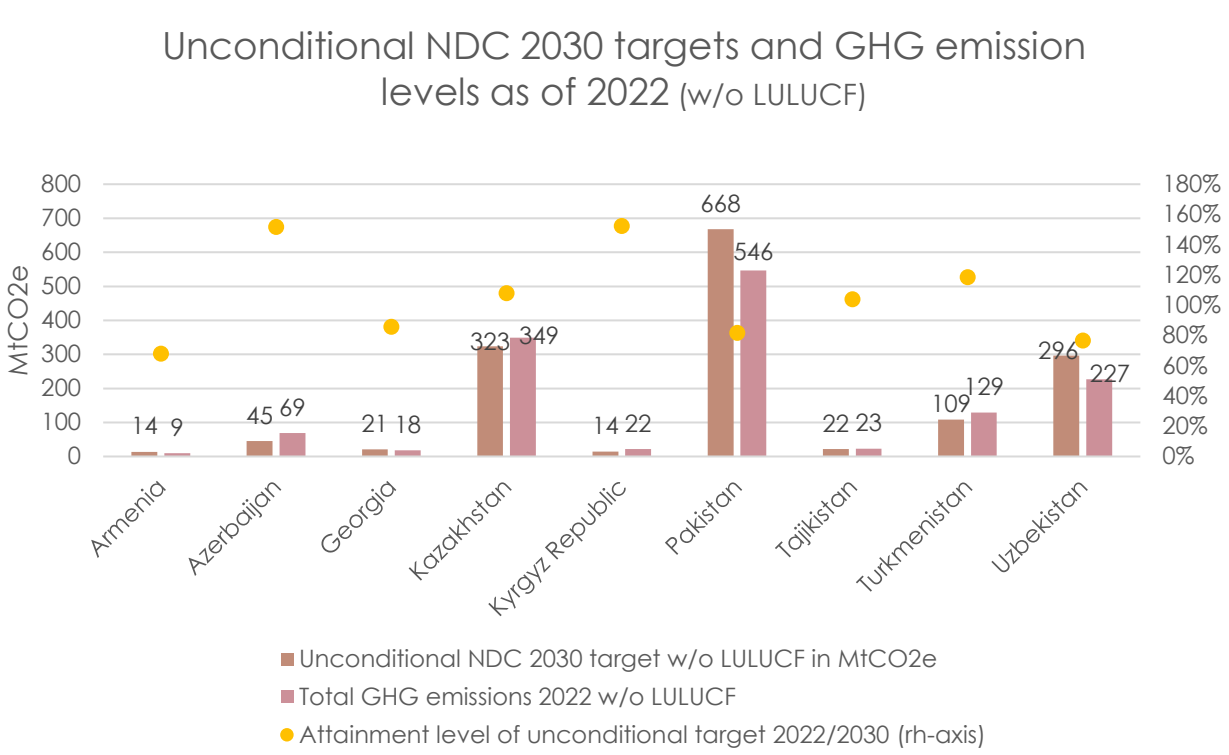
CAREC region: Climate Strategies and Plans

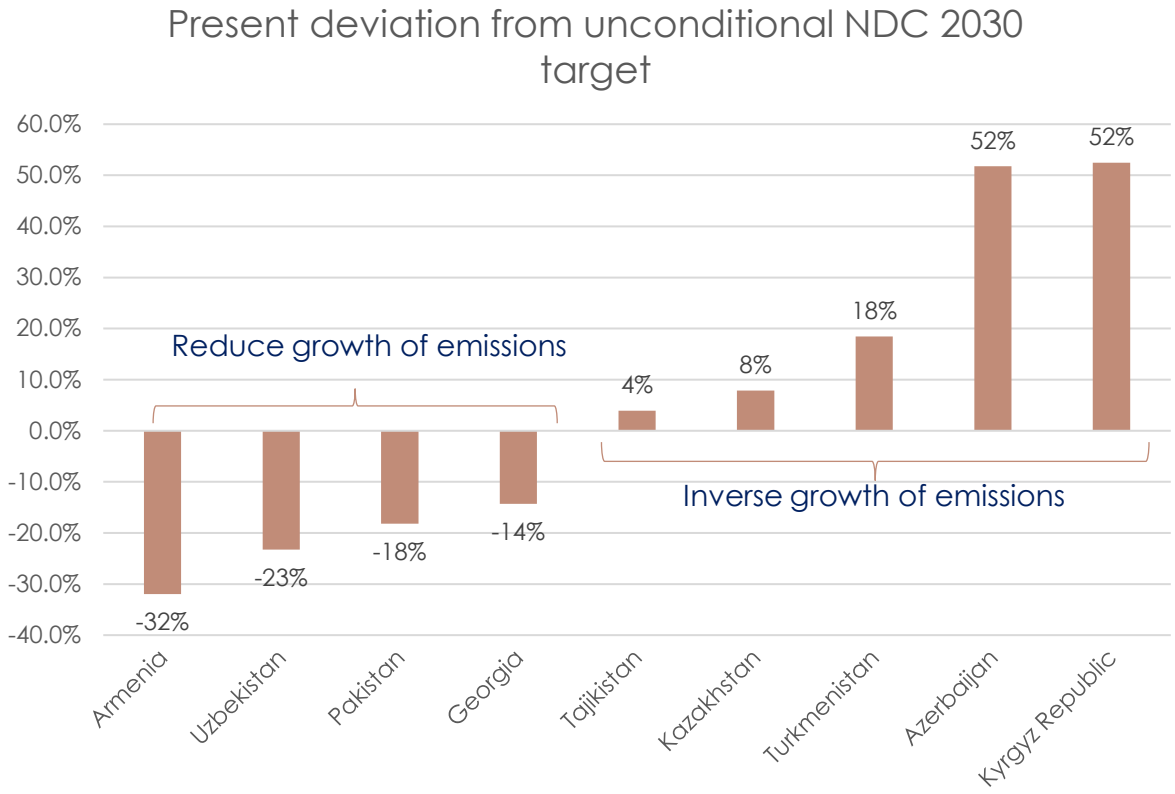
Country	Updated NDC, target by 2030	Climate Strategy	Net-Zero target	NDC implementation plan	Green Transition of the Economy Strategy	Long-term Strategy	National or Sector Adaptation Plan(s)
Armenia	2021, 40% reduction from 1990 emission levels	Not applicable	Not applicable	under development	Draft not passed in 08.2023; pending	Yes, 2023, 2050 mitigation goal: 2.07 tCO2e per capita per annum	NAP 2021-2025
Azerbaijan	2023, 40% reduction from 1990 emission levels by 2050	Yes	Not applicable	Not applicable	Not applicable	Not applicable	under development
Georgia	2021, uncond. 35% reduction from 1990 emission levels	Yes, 2021 and action plan	2050	Not applicable	Not applicable	Yes, 2023	Yes, 2017 Agricultural SAP
Kazakhstan	2023, uncond. 15% reduction from 1990 emission levels	Not applicable	2060	Not applicable	Yes, 2013	Yes, 2020	Not applicable
Kyrgyz Republic	2021, uncond. 15.97% reduction below BAU	Not applicable	Not applicable	draft available and under public discussion (12.2023)	Yes, Phase 1 2019-2023	under development, supports by UNDP	SAPs under preparation, supported by UNDP, GIZ, and ADB
Pakistan	2021, uncond. 15% reduction from 1990 emission levels	Updated National Climate Change Policy, 2021	Not applicable	under development and provincial plans	Not applicable	Under development	Yes, 2023
Tajikistan	2021, uncond. 30-40% reduction from 1990 emission levels	Not applicable	Not applicable	Not applicable	Yes, 2023	Not applicable	National Adaptation Strategy, 2019
Turkmenistan	2022uncond. 20% reduction below BAU (reference 2010)	Yes, passed in 2012	Not applicable	Not applicable	Not applicable	Not applicable	under preparation
Uzbekistan	2021, 35% reduction from 2010 emission level	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	under preparation; UNDP. 2021

CAREC region: Climate Strategies and Plans

Cowater International. 2024

CAREC region: NDC Progress





Source: https://climatedata.imf.org/pages/greenhouse-gas-emissions

CAREC region: climate-smart policies

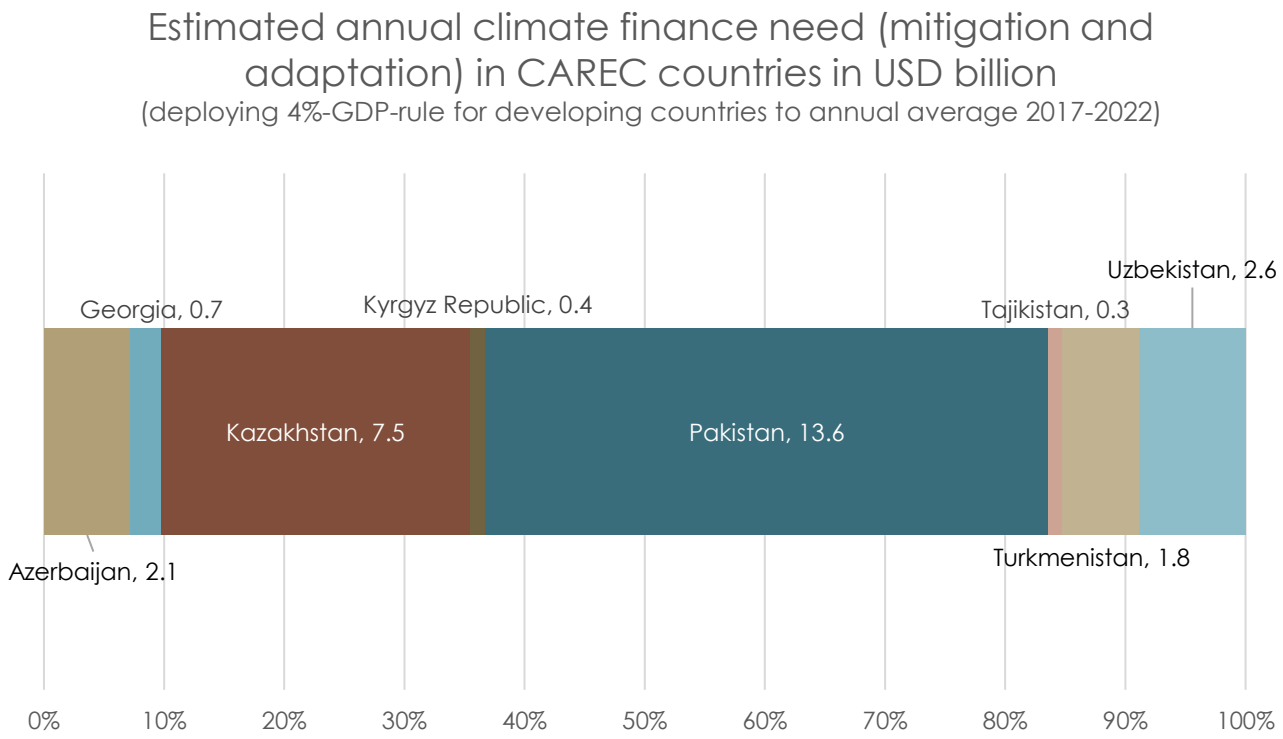
- Estimating economic costs of climate change - **prioritize investment stra**tegies in the future. Suitable mitigation and adaptation mechanisms -reduce environmental externalities vulnerability of the population, especially in rural areas

- Adaptation of higher **water use efficiency** technologies, establishment of **early warning systems** for climate-related extreme events, implementation of **no-till technologies** and **crop diversification, afforestation**, improved crop management – suitable adaptation and mitigation mechanisms for most CAREC countries

- **Financial tools and mechanisms**: credit, insurance, subsidies, carbon market and taxation – suitable financial mechanisms- yet underdeveloped in CAREC countries, except in a few cases and countries

- Example of **successful implementation of financial mechanisms**: dissemination of conservation agriculture in Kazakhstan and adoption of index-based insurance for livestock production in Mongolia

CAREC region: Climate Financing needs



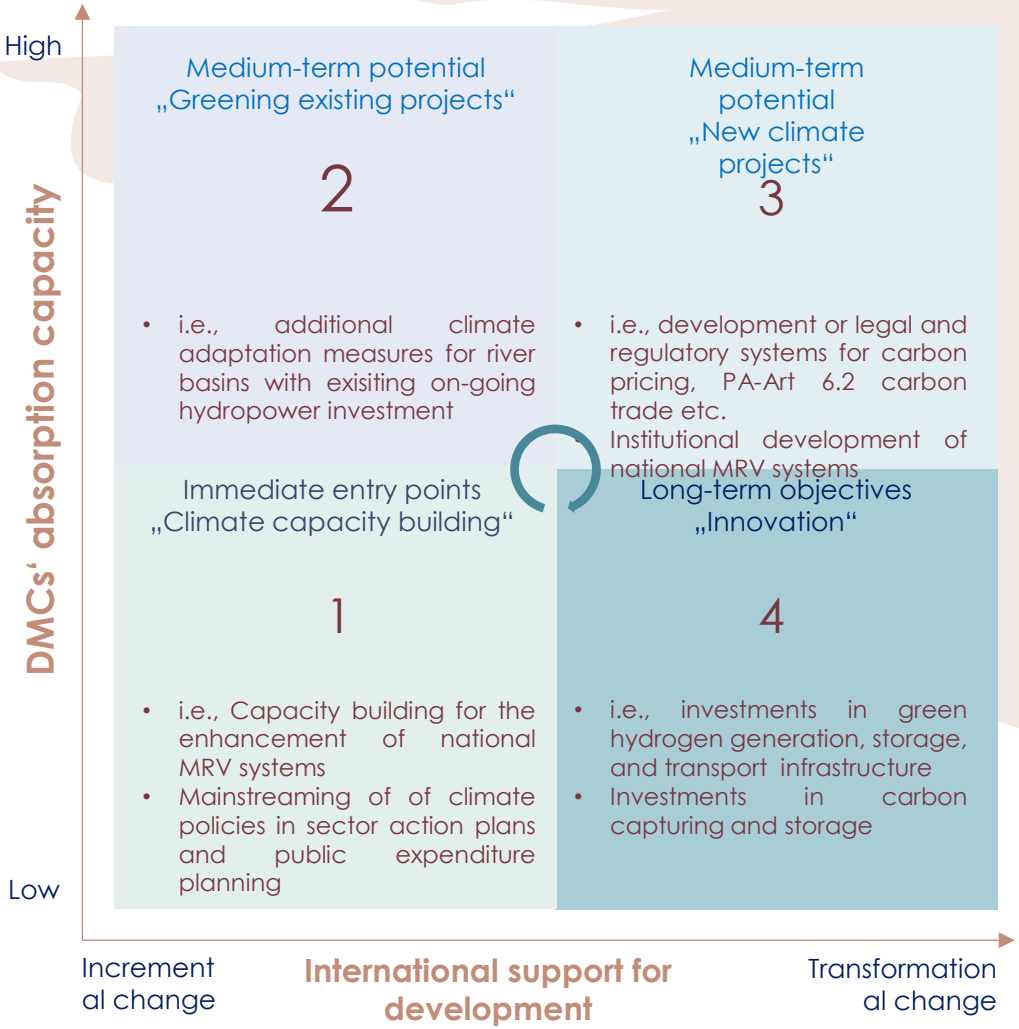
Estimated total finance needs for current NDC-2030 commitments in West and Central Asia: ca. **USD 300 billion.**

Based on the assumptions of 4 percent GDP (of that 2/5th from domestic sources, and 3/5th from international sources) to adequately finance climate mitigation and adaptation in developing countries, the **average annual climate finance need in CWRD is estimated at ca. USD 30 billion.**

Ca. USD 18 billion annually are needed from international sources.

Source: https://www.adb.org/sites/default/files/publication/901611/climate-finance-landscape-asia-pacific.pdf

CAREC region: Climate Interventions



1st square:
- Actions, described in DMCs' short-term action plans
- Focusing on capacity building
- Leading towards enhanced climate policy framework and sector policies

2nd square :
- Actions, described in DMCs' mid-term strategy plans
- Building on existing sector or thematic activities of IFI's
- Integrating climate aspects through projects for climate programing

3rd square :
- Actions, described in DMCs' mid-term strategy plans
- Programmatic, results-based or sector approaches
- New sector-specific or policy-specific lending opportunities

4th square :
- Actions, described in DMCs' long-term strategy plans
- Programmatic, results-based or sector approaches
- Require building up of new internal capacities within ADB

CAREC region: Climate Interventions

- **Short term-** a series of training sessions:
  - upon the demand of the DMCs,
  - **concentrated on training high-level technical experts and policymakers from the critical sectors of the economy**.
  - coordinated between IFIs, international organizations, and bilateral and multi-lateral projects

- **Mid-term**- demonstration pilots could be developed as "best practices":
  - climate-proof financial tools, climate-proof construction standards and materials, CO^2 trade instruments, etc.
  - Pilots will be supported by TA and used as good/ "best practices" for dissemination
  - DMCs - take up and establish similar systems and practices based on "best practices" cases
  - The documented "best practices" - transferred to the national education systems of DMCs in the third stage of CBSP.

- **Long term-** supporting national capacity-building systems:
  - training centers, universities, and schools - **integrate the topic of climate change into national teaching and training.**
  - The principal partners - Ministries of Education (high and school) and professional training systems of DMCs.
  - Developing the syllabuses, curricula, and handbooks - **significant support.**
  - ToT and experts trained in short and long-term interventions - engaged in the long-term intervention.
  - ADB's education projects - climate change aspects in the support package,
  - PBLs - prioritize educational programs with a climate change focus.

CAREC region: climate-smart- governance

- **Effective climate governance** should create a system of **interactions** with global and regional developments and financial stakeholders, allowing to analyze how different **financial resources are directed** rationally in tackling climate challenges

- **Effective climate governance** brings opportunities to countries and the CAREC region for further **scaling up efforts** to tackle climate change challenges by **mobilizing yet untapped funds**, expertise, and technologies

- **Lack of effective governance**: coordination or limited inter-agency cooperation downplays the practical application of laws and response policies. Important to analyze and understand how **policy coordination patterns** are well-aligned in reinforcing mechanisms

CAREC region: climate-smart-governance

- **NDC-SDG connections**: assessment of **policy coherence** in the CAREC region and prospective for entry points for changing or improving governance in the countries, also vis-à-vis legislation

- **Comprehensive policy mechanism**: clear interaction in both **vertical and horizontal dimensions** of governance, broader understanding of the involvement of the private sector, local farmers, and populations in the decision-making process of national climate policies