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REPUBLIC OF ARMENIA
MINISTRY OF ENVIRONMENT

UNDP

EU4CLIMATE REGIONAL WORKSHOP

Overview of Armenia's Experience and Challenges in Undertaking Climate Risk and Vulnerability Assessment

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April 3, 2023, Warsaw, Poland

“National Adaptation Plan to Advance Medium and Long-Term Adaptation Planning in Armenia” (NAP) UNDP-GCF Project

- **Duration:** 2019 - 2022 (48 months)
- **Project objectives:**
  - Build medium- and long-term climate change adaptation (CCA) planning capacities in Armenia
  - Increase resilience, reduce risk and vulnerability
  - Integrate CCA into fiscal, regulatory and development policies, programs and activities
  - Support climate change resilient development in Armenia

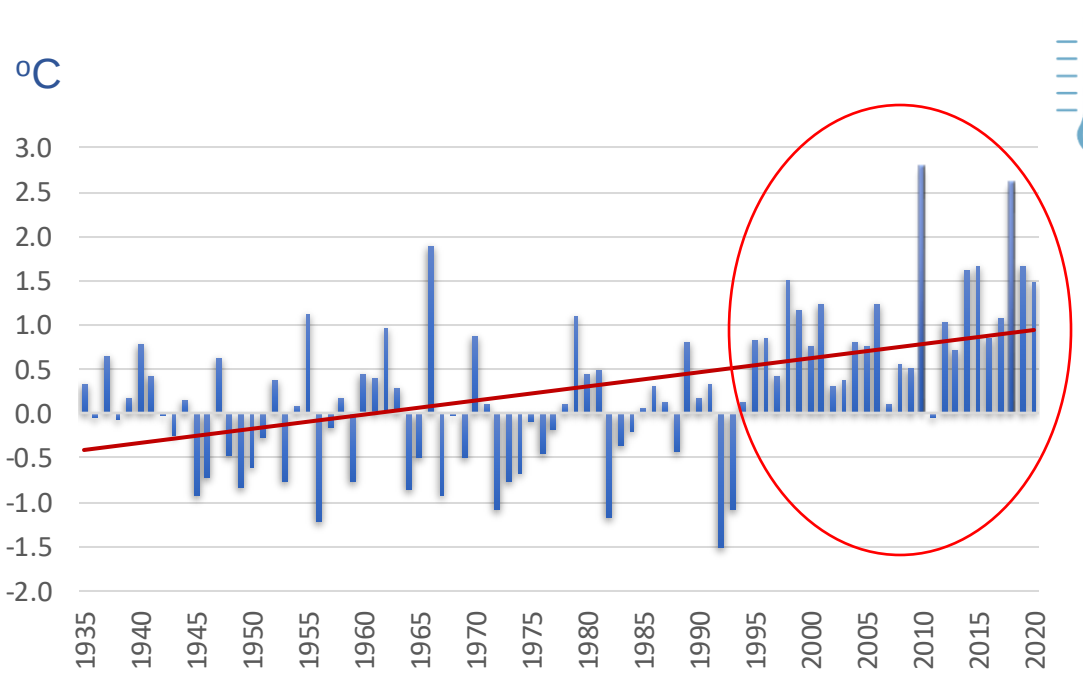
International Context for Adaptation

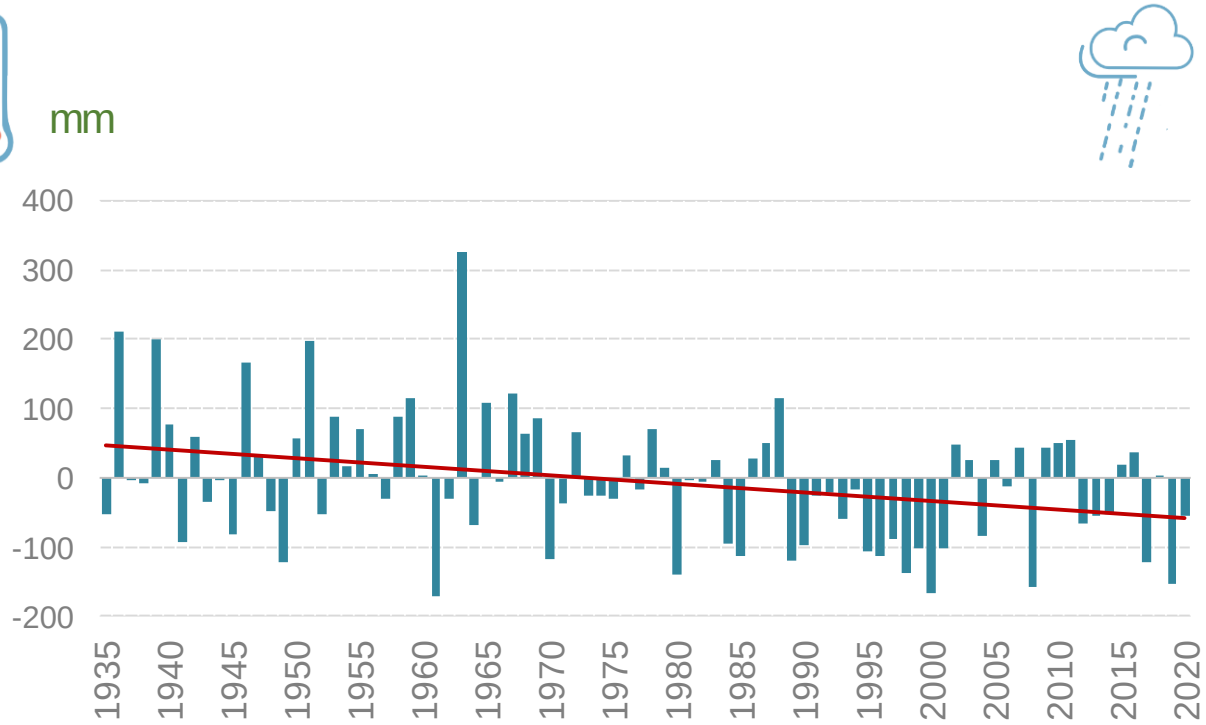
- UN FRAMEWORK CONVENTION ON CLIMATE CHANGE
- PARIS AGREEMENT
- ARMENIA'S NDC 2021-2030 (Gov. Decree N 610-L, 2021)
- UN SUSTAINABLE DEVELOPMENT AGENDA 2030

United Nations Framework Convention on Climate Change

PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

Average annual air temperature and precipitation changes in 1935-2020 against 1961-1990 baseline norms



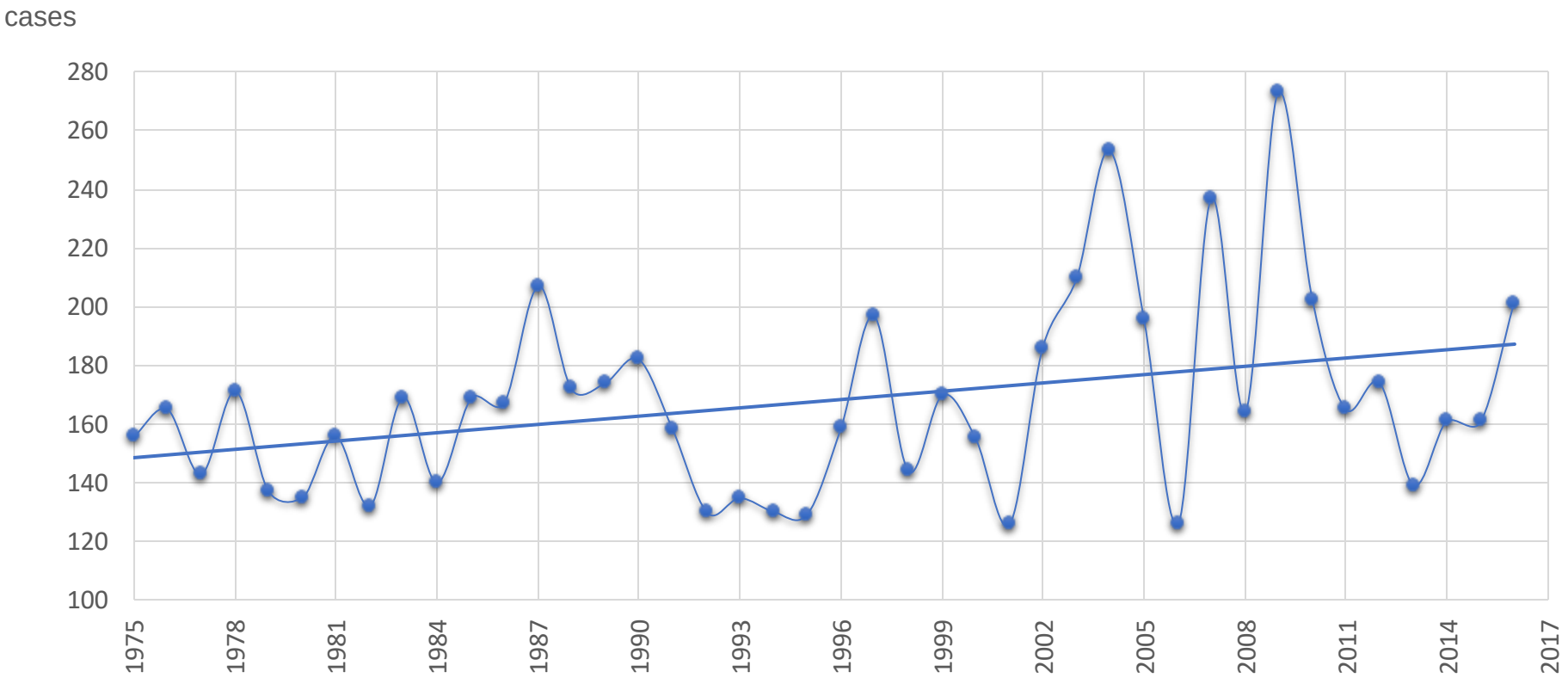


Annual average temperature increase (1935-2020): **+1.38 ^{0}C**

Annual average precipitation reduction (1935-2020): **-14%**

Source: HMC of MoE, 2020

Trends of observed cumulative cases of hazardous hydro-meteorological phenomena: hail, frost, strong winds, heavy rainfall in 1975-2016

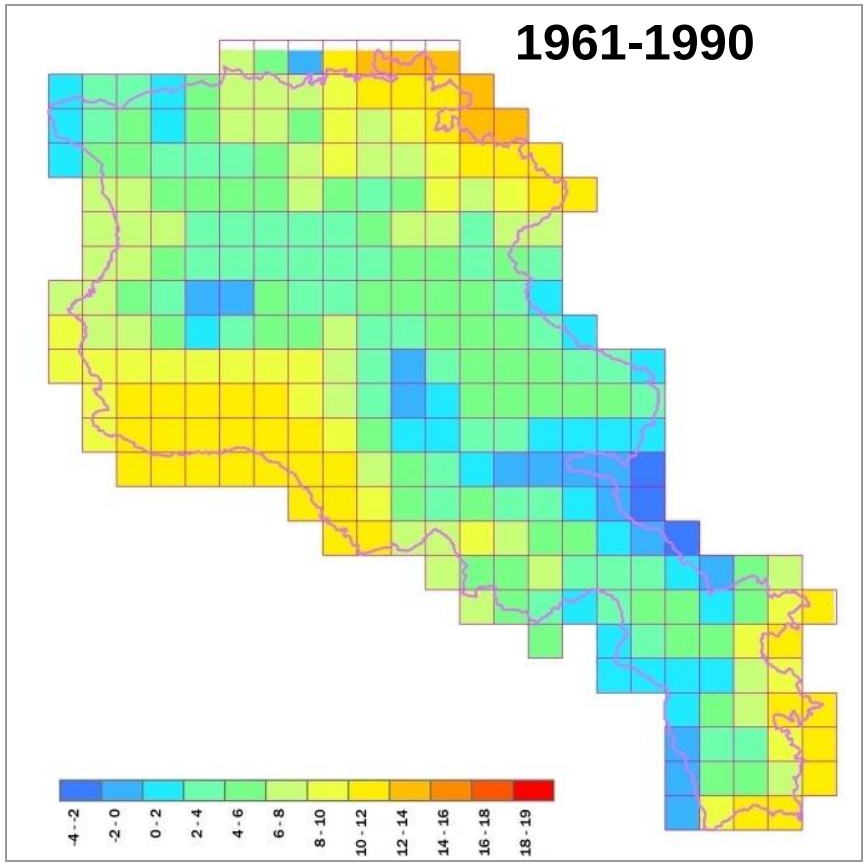


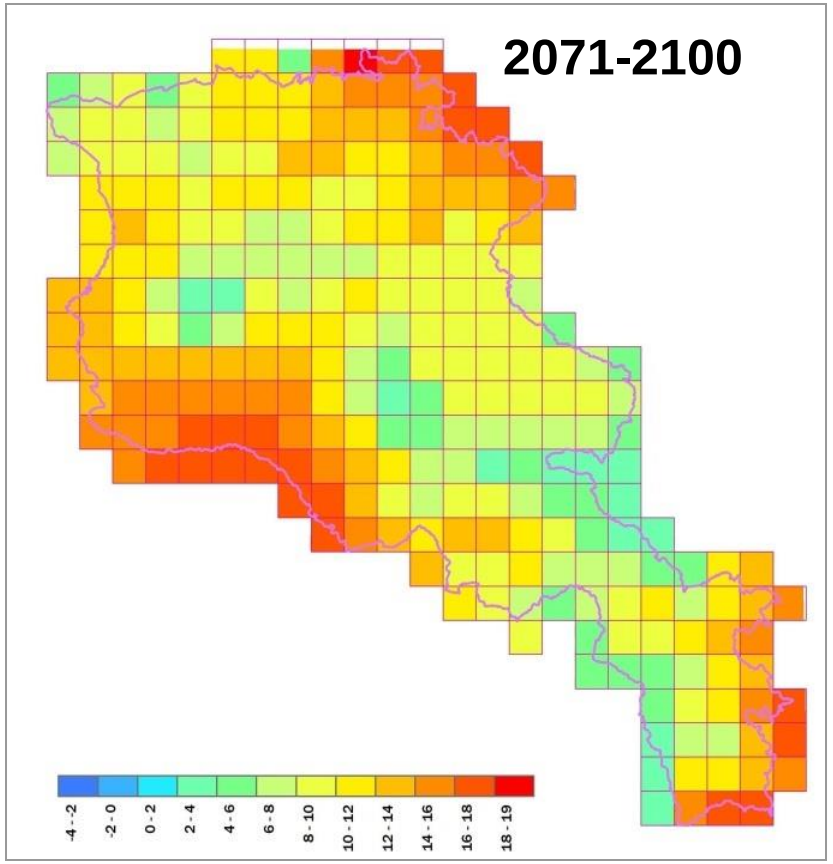
Increase of occurrence (1975-2016): by **23.5%**

Source: Armenia's 4NC, 2020

Projections of annual average temperature by 2100 against baseline norm

Per RCP 8.5 scenario, METRAS Model



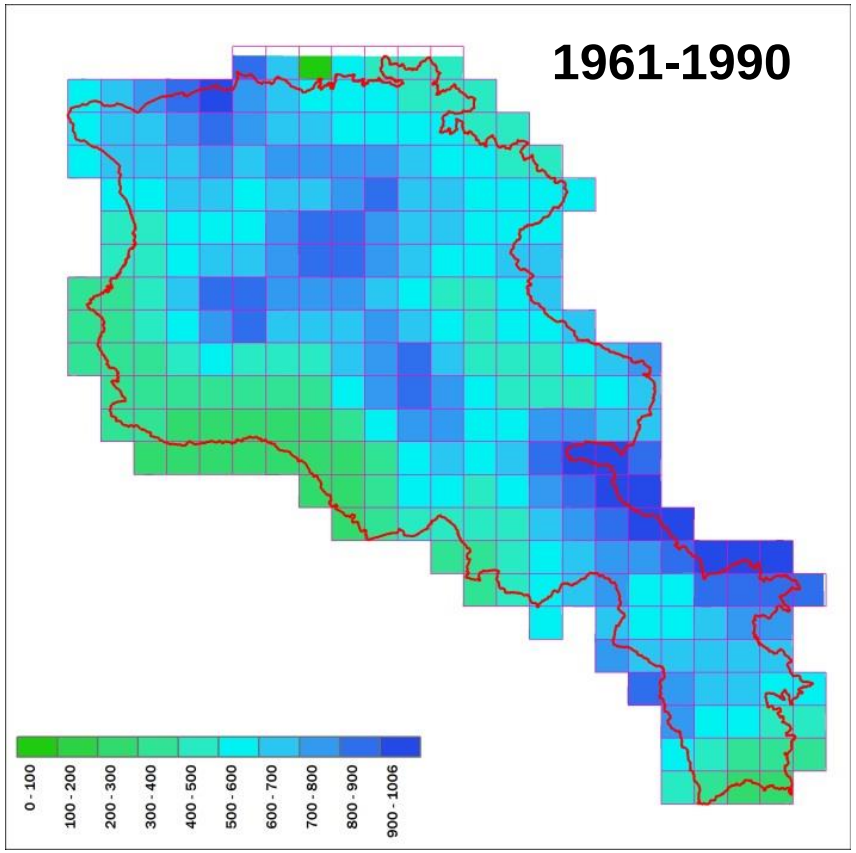


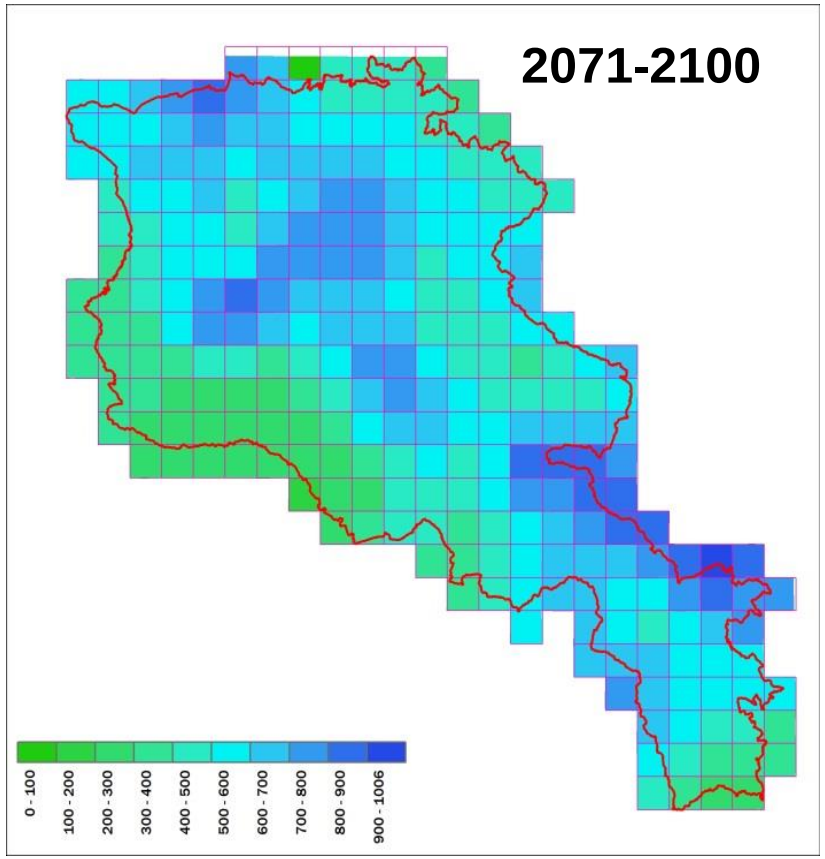
Increase:
by **4.7 ^{0}C**

Source: Armenia's 4NC, 2020

Projections of annual average precipitation by 2100 against baseline norm

Per RCP 8.5 scenario, METRAS Model





Decrease: by **8.3%**

Source: Armenia's 4NC, 2020

Legal Framework for NAP implementation in Armenia

- **RA Government N 749-L** on "National Action Program of Adaptation to Climate Change and the List of Measures for 2021-2025", dated 13.05.2021, consisting of:
  - ✓ *NAP framework, vision, objectives, directions, principles, adaptation barriers, risks, institutional arrangements for coordination and oversight of NAP process, M&E, etc.;*
  - ✓ *Action Program of 26 prioritized measures for 2021-2025 – for 1) NAP enhancement at national level and 2) institutional and technical capacities' enhancement of NAP process.*

- **Prime Minister's Decree N 719-A** on "Establishment of an Inter-Agency Coordinating Council (IACC) on implementation of requirements and provisions of the United Nations Framework Convention on Climate Change and the Paris Agreement", dated 06.07.2021
  - ✓ *Defining composition of IACC, working procedures, objectives, structure, power, WGs, Secretariat, activities, procedure and frequency of sessions, among others.*

- **Deputy Prime Minister's Decree N 894-A** on "Establishment of Standing WGs of the Inter-Agency Coordination Council on Climate Change, their structure and responsibilities", dated 05.11.2-21
  - ✓ *Defining structure of each of the 3 WGs, working procedures, functions, other arrangements.*

Implementation of CRVA and Adaptation Planning in Armenia

CRVA and Adaptation Planning conducted in the following prioritized sectors (2021-2022)
Water
Agriculture
Health
Energy
Tourism
Settlements (Yerevan)

CRVA and Adaptation Planning conducted at Province/Marz level (2021-2022)
Shirak
Tavush

Other priority sectors/regions expected to undergo CRVA and Adaptation Planning (2023-2025)
Ecosystems
Lake Sevan
Transport
8 other Regions/ Marzes
Other urban settlements
Rural settlements

CRVA- An integrated part in National Adaptation Planning process

1. Stocktaking

1. Inventory of available data and information (institutional framework, legal aspects etc.),
2. Collection and review of available studies;
3. Identification of gaps and limitations.

2. Climate Risk & Vulnerability Assessment

1.Analysis of CC trends and projected scenarios,
2.Assessment of climate risks and vulnerabilities, including identification of risks, CC hazards, exposure, sensitivity and adaptive capacity

3. Adaptation Planning

1. Short-, mid- and long-term adaptation planning,
2. Prioritization of adaptation measures
3.Stakeholder validation
4.Mainstreaming into sectoral / regional policies and strategies

4. Adaptation Implementation, M&E

1. AM&E framework design
2.Indicators
3.SOP to enabl:
- Monitoring the NAP process,
- Assessing progress, efficiency of adaptation measures\
- Reporting

4.Updating NAP.

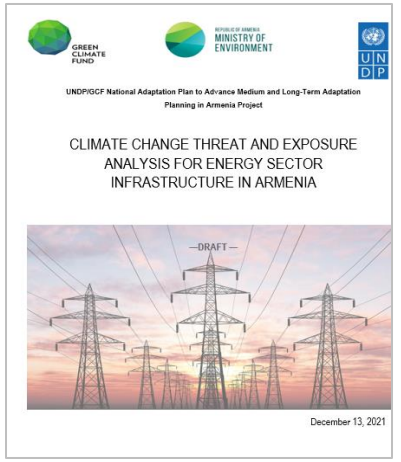
5.Financing strategy (at state, donor, private sector, community levels) and instruments (PPP, Debt-for-Climate swaps, etc.) recommended to support continuous adaptation implementation

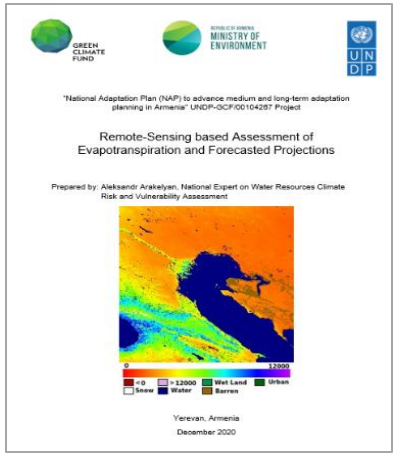
CRVA approaches and methodologies

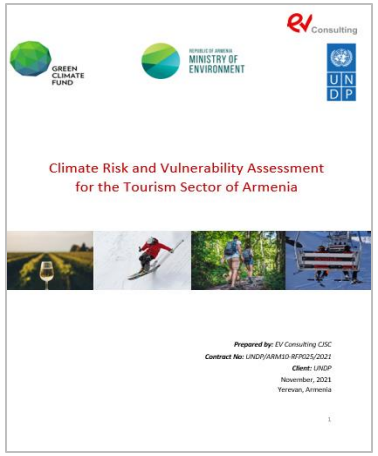
- Adopted a mix of top-down (i.e. quantitative data, e.g. census/statistical data, downscaled climate models; mapping) and bottom- up (i.e. qualitative data, e.g. local knowledge for identification of risks/ their likelihoods) approaches;
- Applied sector-wide, sub-sectoral, nation-wide, sub-national, water basin or other geographic/spatial divisions approach for CRVAs;
- Applied Indicator-based vulnerability assessments - sets of pre-defined indicators are used - both quantitative and qualitative for assessing through modelling or stakeholder consultations;
- Applied gender sensitivity and widely participatory approach;
- Was built on the climate change trends, projections and scenarios from Armenia's 4NC (2020).

Choice of CRVA approach and/or methodology was guided by:

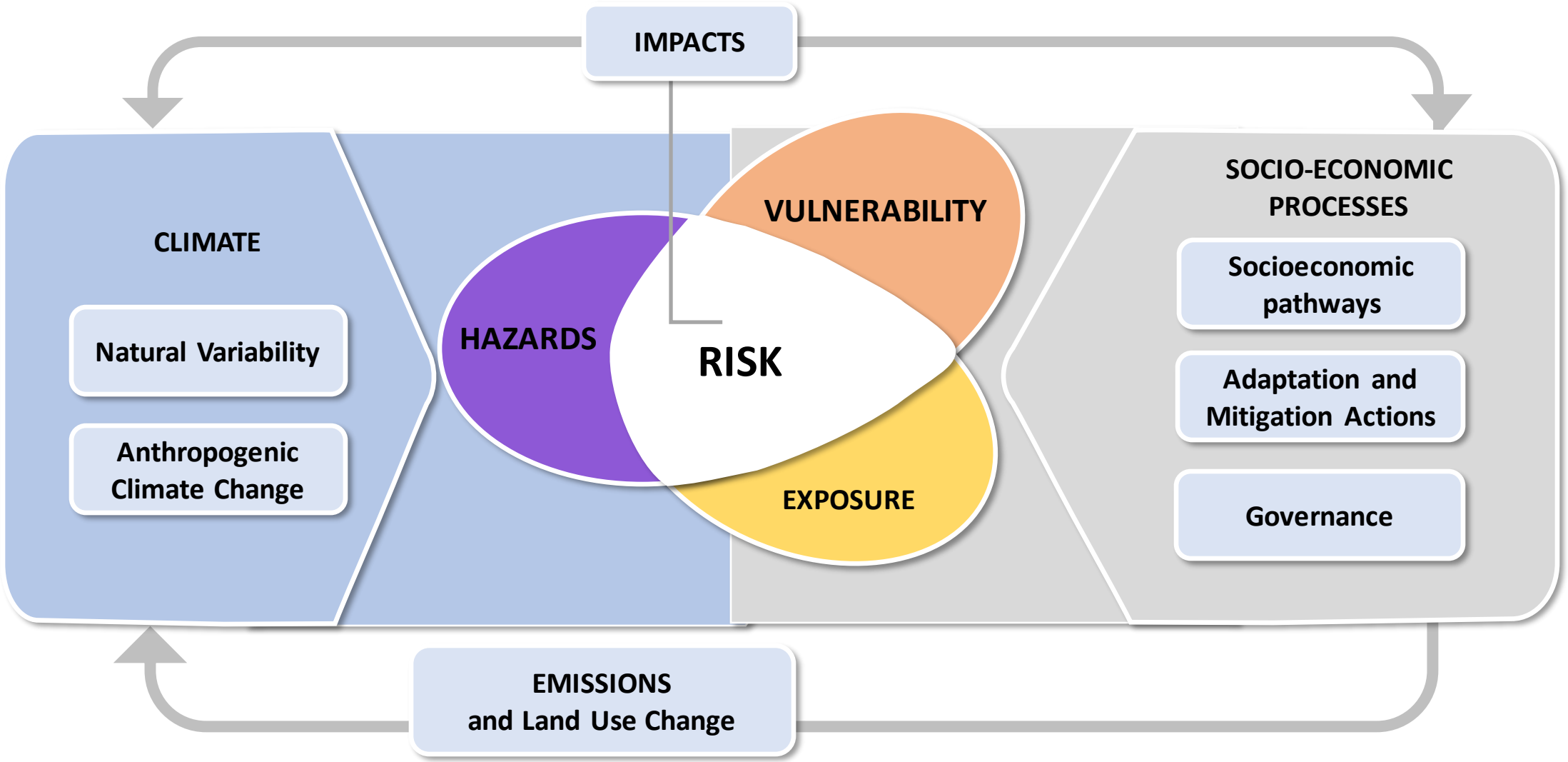
- Data availability, homogeneity;
- Existing knowledge (incl. assessment methodologies);
- Human, financial, time resources available;
- Scale and range of potential risks.







IPCC conceptual framework applied for CRVA



Main seps and activities applied in CRVA (Tourism, Agriculture, Province level CRVAs)

Identifying indicators

Hazards
- ✓ Climate extreme events
- ✓ Climate induced disasters

Exposure
- ✓ Sector infrastructure
- ✓ Sector-specific sites
- ✓ population

Vulnerability (sensitivity and adaptative capacity)
- ✓ Geographic location
- ✓ Proximity of sector-specific sites to hazard prone area/zones (landslides, floods, avalanches etc.)
- ✓ Physical and structural condition of sites
- ✓ Access to finance, insurances, education/ awareness, policies available etc.

Data/Information collection

Secondary data
- ✓ Databases,
- ✓ Publications
- ✓ Statistical bulletins
- ✓ Assessments, literature

Primary data
- ✓ Surveys
- ✓ Focus group discussions
- ✓ Stakeholder consultations

Data processing, harmonization (per scale, format, methodology), etc.

Assessment

Trends, projections

Likelihood of Hazard
- via evidence metrics

Exposure
- via scoring system

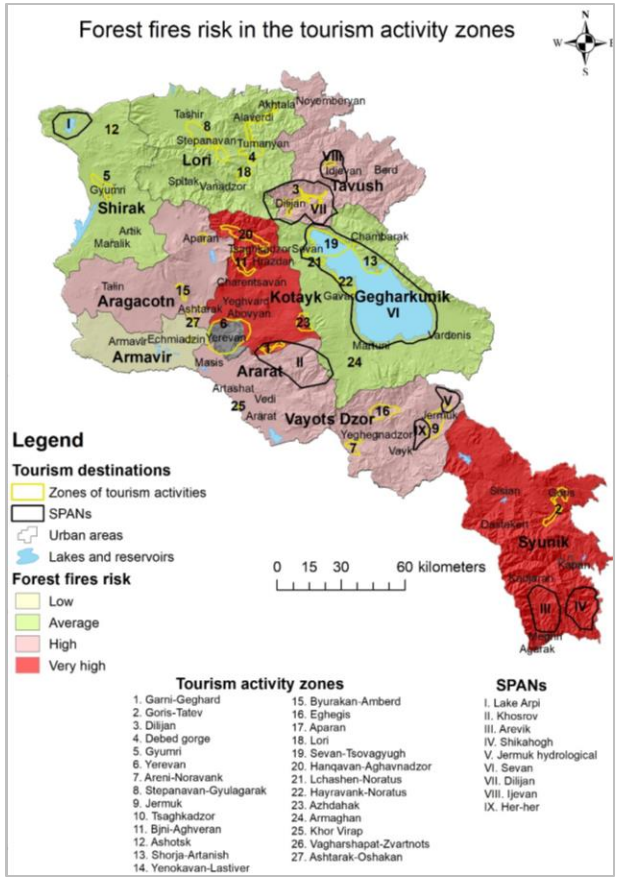
Vulnerability
- *Sensitivity*
- *Adaptative Capacity*

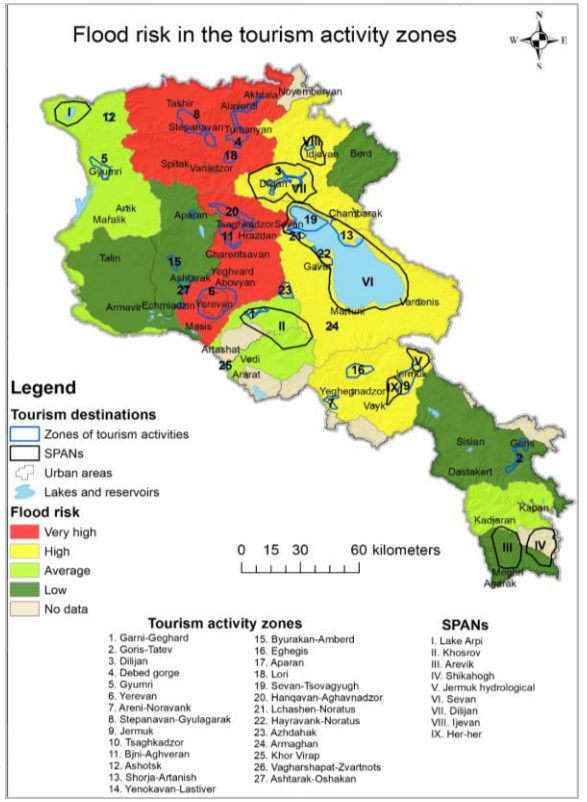
- via scoring system

Risk profiling
- high-, medium-, low- level of probability confidence

Example of hazard risk profiling and risk mapping (Tourism)

Hazard	Likelihood	Exposure	Vulnerability
Cold waves	About as likely as not	Medium-High	Medium-High
Cold waves/ extreme cold temperatures	About as likely as not, with the exception of Gyumri were the hazard is quite likely to occur	Low-High	Medium-High
Decreased precipitation	Unlikely or about as likely as not	Low/High	Medium-High
		Low-High	Medium-High
Flooding	Unlikely	Medium-High	High
Forest fires	Unlikely or about as likely as not	High	High
Heat waves	Likely or very likely	Low/High	Medium-High
Heat waves/ extreme hot temperatures Drought	Largely depends on the destination Likely or very likely	Medium-High	Medium-High
Landslides	Likely	Low	Medium
Mudflows	Unlikely or about as likely as not	Medium-High	High
Rockfall	About as likely as not	Low	Medium
Snowstorms	About as likely as not in Vayots Dzor	Medium	Medium-High

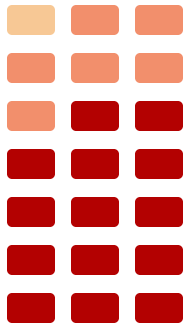




Example of CC impacts' ranking (Energy)

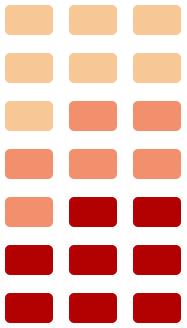
Climate Indicator	Semi-Qualitative Threshold	Nuclear	TPP	HPP	SHPP	Transmission sub-stations	Natural Gas Pipelines
Ambient air temperature	Decrease in operational efficiency at +1ºC	Low	Low	Moderate	Moderate	Moderate	Low
	Decrease in operational efficiency at +3ºC	Low	Moderate	High	High	Moderate/High	Moderate
Water temperature	Increase of +0.7ºC for every +1ºC of ambient air temperature (small reservoir /enclosed)	Low	Moderate	Low/ Moderate	Low	Low	Low
Precipitation	Change in precipitation	Low	Low	Moderate	Moderate	Low	Low
Water quantity	Change in % river flow	Low	Low	Moderate	Moderate	Low	Low
	Increase of 1.5% in evaporation for every +1ºC of ambient air temperature	Low	Low	Low	Moderate	Low	Low
Heavy rain events (flooding)	Spatial distribution	Low	Low	Low	Moderate	Moderate	Low
Heavy rain derived events (avalanches, landslides and mudflows)	Spatial occurrence	Low	Low	Low	Moderate	Moderate	Moderate
Freezing rain (hail and frost events)	Spatial distribution	Low	Low	Low	Moderate	Moderate	Low
Drought (wildfire and drought)	Spatial distribution	Low	Low	Moderate	Moderate	Low	Low

Example of “Exposure” assessment (Energy infrastructure) to temperature related impacts in 2040



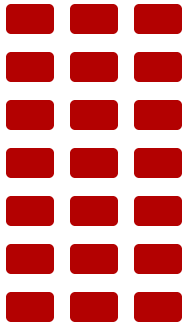
66% high & very high exposure

Mid & Large PPs



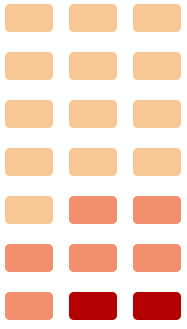
36% high & very high exposure

SHPPs



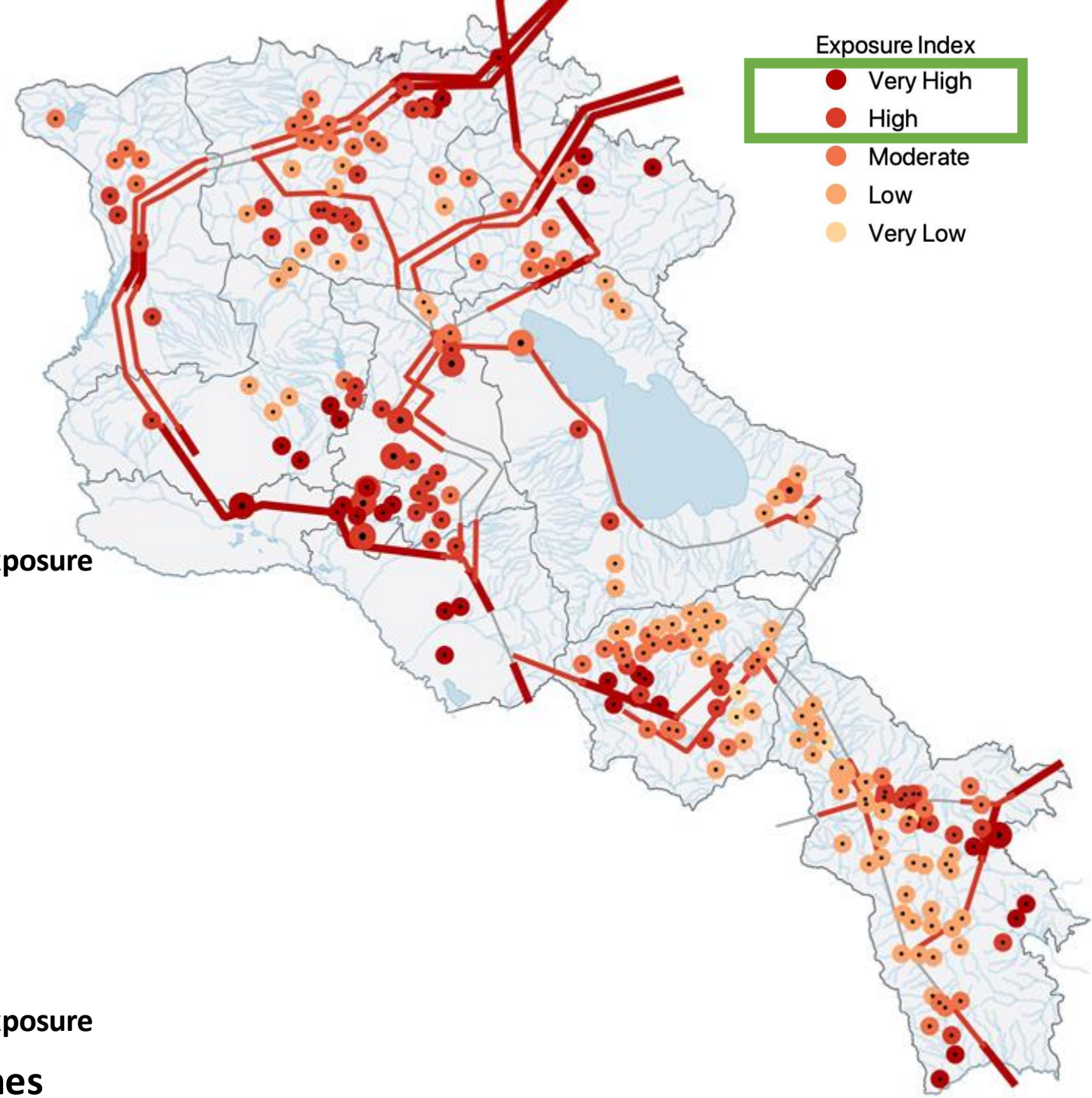
100% high & very high exposure

Transmission sub-stations



11% high & very high exposure

Gas supply pipelines



Socio-economic dimensions of CRVA

Economic aspects/dimension include:

- Sector GDP contribution trends
- Employment and income generated within sector
- Consumption
- Migration, relocation of businesses/population, diversification of profiles

Social aspects/dimension include:

- Occupational groups (farmers, tour operators, etc.)
- Poor, rural population, people with health conditions
- Losses and damages within a sector
- Economic stability, food security, energy security, etc.

Gender sensitivity and inclusiveness in managing CC risks

- Social status of women, roles and responsibilities
- Access to education, awareness on their own rights,
- Women Engagement in decision making and leadership roles, proprietary rights
- Employment, access to finance
- Cultural aspects, etc.

Common challenges, limitations, barriers faced throughout conducting CRVAs

Data & information gaps, access issues

Common challenges, limitations, barriers faced throughout conducting CRVAs

Institutional gaps

- Lack of overall vision, strategy, institutional understanding and capacity for CRVAs;
- Insufficient level of ownership by institutions in the CRVA process
- Inadequate level of inter-institutional cooperation and coordination in case of cross-cutting matters;
- Funding for continuous specialized studies is not prioritized and supported by line ministries
- Scientific community is not fully engaged in decision development and justification process

Technical/capacity gaps

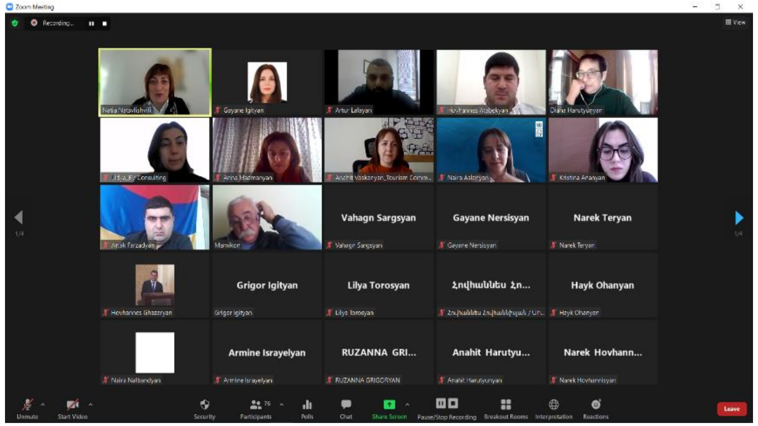
- Lack of skills and capacities to use modern technologies for qualitative and quantitative assessments, such as drone/satellite generated imagery, GIS and Remote Sensing software, etc. to be used for data collection, analysis and application in CRVAs;
- Limited analytical and technical capacities and methodologies for sectoral CRVAs, including loss and damage assessment, socio-economic impact assessment - as part of CRVA process

Other

- COVID 19, other

ATTEMPS TO ADDRESS AND OVERCOME SOME OF THE IDENTIFIED CHALLENGES

Wide awareness raising and capacity building activities

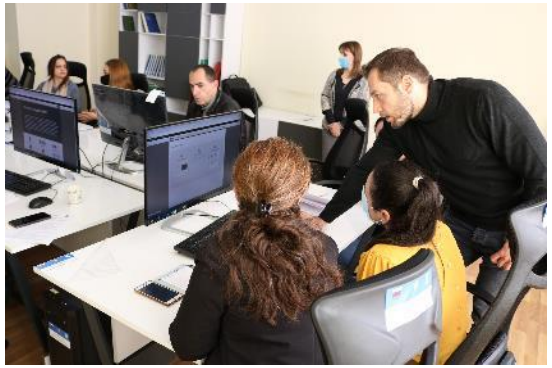


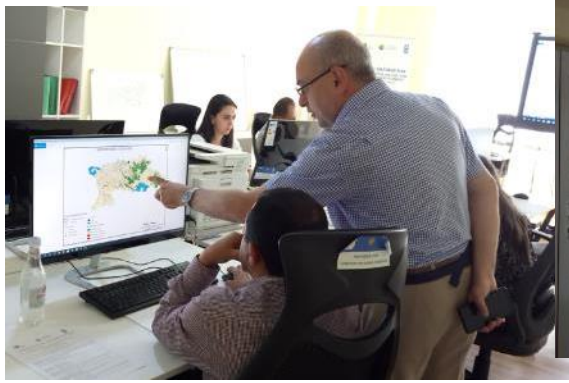
Training for provincial/Marz governing bodies on “Mainstreaming climate change into provincial and community development strategies”

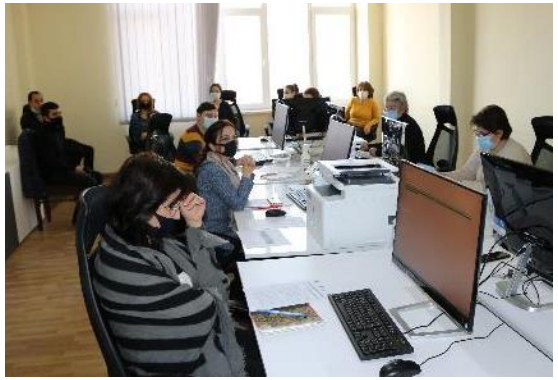
Capacity building for the staff of "Hydrometeorological Monitoring Center" SNCO of the Ministry of Environment

Series of trainings, including:

- Application of satellite imagery for assessment and projection of actual and potential evapotranspiration and assessment of water resources vulnerability to climate change;
- Use of UAVs (drones) in environmental monitoring, hydrological studies and data collection for spatial analysis;
- Introduction to GIS;
- Application of GIS for hydrological analysis.



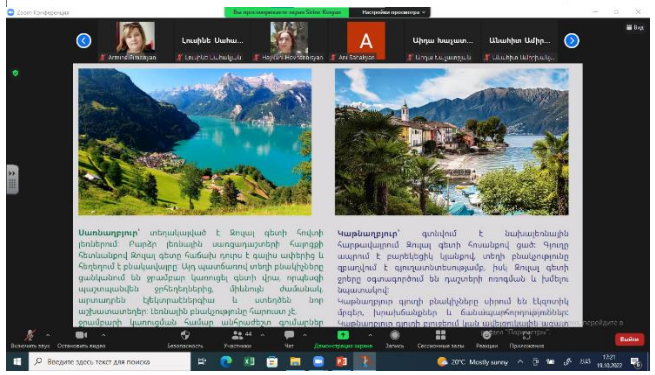




Training for students, media representatives, schoolchildren

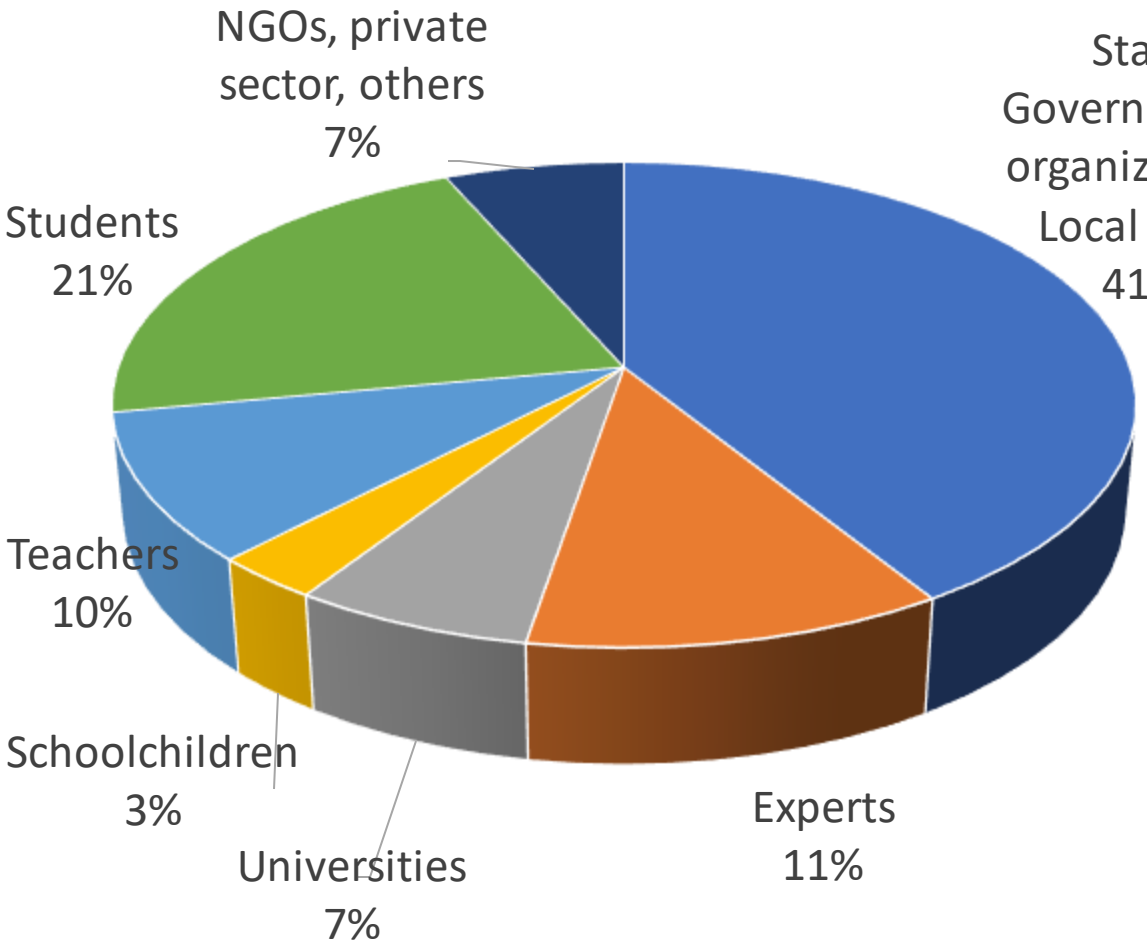
Integration of CC risks and vulnerability issues as well as adaptation approaches in educational curricula at various levels (schools, universities)

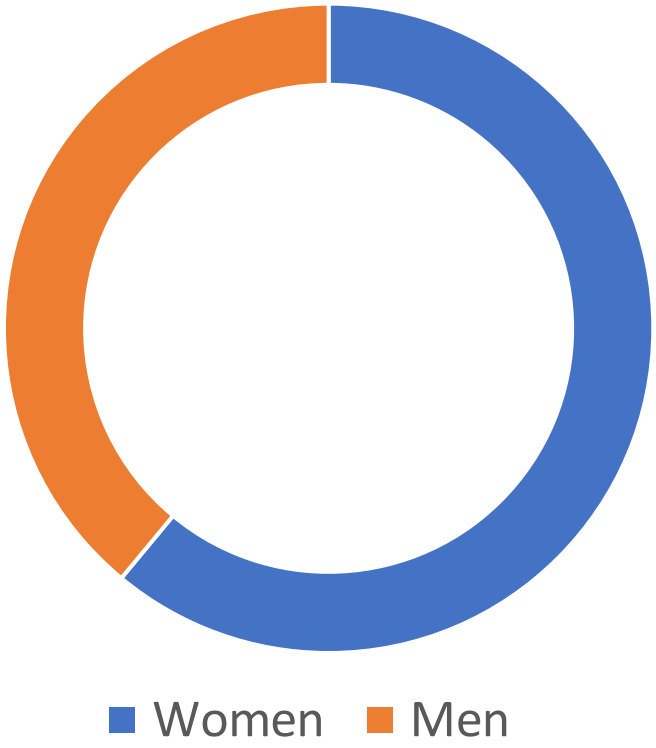
Over **300** teachers trained



Various educational materials, guidelines, posters, animated videos developed and disseminated

Over 3200 participants engaed in CRVA and adaptation planning processes





THANK YOU

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