

Balkans, Eastern Europe and Central Asia:  
overview and practical approaches  
on water and flood management

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# Climate change in the West Balkans

	ALBANIA <sup>1</sup>	BOSNIA AND HERZEGOVINA	CROATIA	THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA	MONTENEGRO	SERBIA
Air temperature change (last half century)	↑	↑ <sup>2</sup>	↑	↑	↑	↑
Precipitation change (last half century)	↓	↔ <sup>3</sup>	↓	↓	↔	↔
Extreme weather events and climate-related hazards (1990–2009)	↑	↑	↗	↑	↑	↑
Water resources availability in the future (forecast period until 2100)	↓	↓ <sup>4</sup>	↓ <sup>5</sup>	↓	↓	↓
Health infectious and vector-borne diseases <sup>6</sup>	↑	↑	↑	↑	↑	↑
Greenhouse gas emissions (in CO <sub>2</sub> eq) for period observed	↓	n.a. <sup>7</sup>	↗	↓	↓	↓
Policy instruments, actions and awareness	↑	↗ <sup>8</sup>	↑	↑	↑	↑
Climate observation and weather services (1990–2009)	↗	↗	↑	↗	↗	↑



# Climate change in the West Balkans

- ▶ Less precipitation and further decrease are projected



Change in precipitation, 1951-2006



Change in temperature, 1951-2006



- ▶ The region is getting warmer and dryer
- ▶ The frequency and intensity of floods and droughts have increased










## Climate change hotspots

### Change in annual precipitation by the 2050s


-  Increase
-  Decrease

 Temperature increase by 1.7-2.3°C by 2050 across the region (depending on the model and scenario)

### Present risks intensified by climate warming

-  Risk of forest fires
-  Risk of desertification
-  Risk of decreasing farming productivity and risk of failures of rain-fed crops
-  Sea level rise impacts on coastal erosion and salt water intrusion

 Risk of floods

 Drought and heat waves

### Projected change in mean seasonal and annual river flow between 2071-2100 and the reference period 1961-1990

-  Increase
-  Stable
-  Decrease

# Disaster Risk Mitigation and Adaptation Project for Albania (the World Bank):

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- ▶ *Component 1: Disaster Risk Management and Preparedness*
  - Strengthening disaster risk Mitigation Planning and Emergency Management
  - Enhancement of emergency response capacity
- ▶ *Component :2 Strengthening of Hydrometeorological Services*
  - Supporting disaster risk reduction through provision of accurate hydrometeorological forecast and service tailored to the needs of disaster risk managers in weather-sensitive sectors
- ▶ *Component 3: Development of Building Codes*
  - develop a national building code
  - train engineers in new design standards
  - develop a mechanism for licensing of engineers
- ▶ *Component 4: Catastrophe Insurance*
- ▶ *Component 5: Project Management*



## Regional initiatives:

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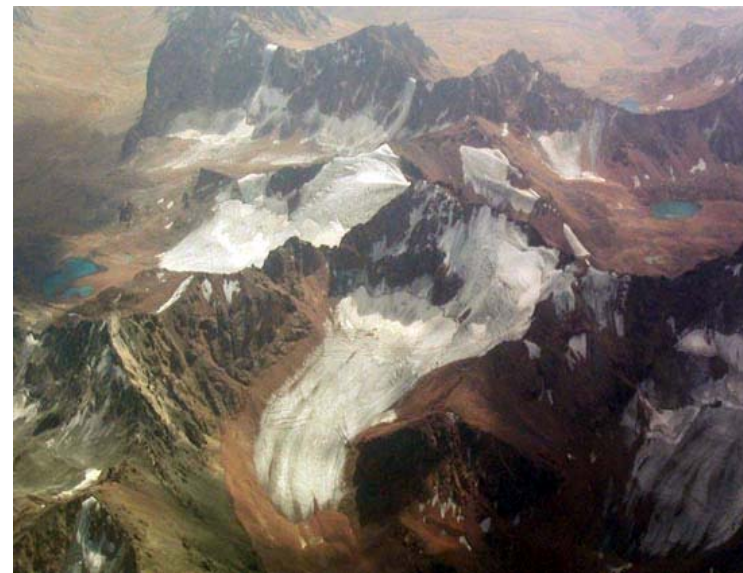
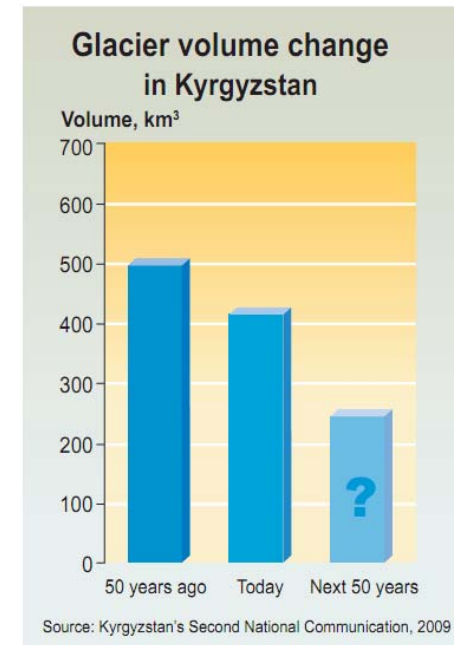
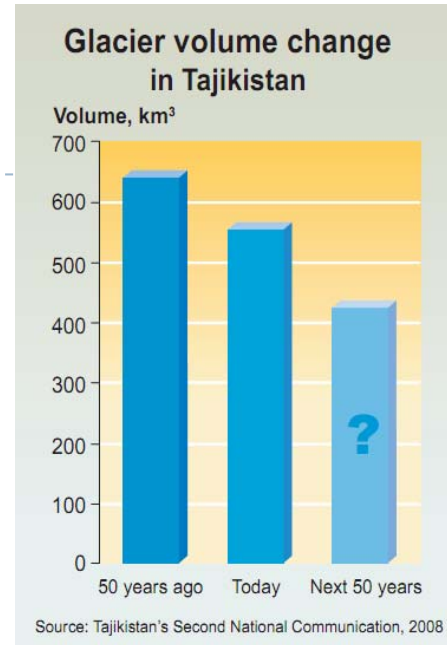
- The South-East European Climate Change Framework Action Plan for Adaptation
- The EU Stabilization and Association process
- The Alpine and Carpathian Conventions

*“Any new scheme designated to coordinate adaptation in the West Balkans would do well to consider the array of organizations, programmes, initiatives and agreements currently contributing to adaptation projects and strategies in the region”*



# Climate change in Central Asia

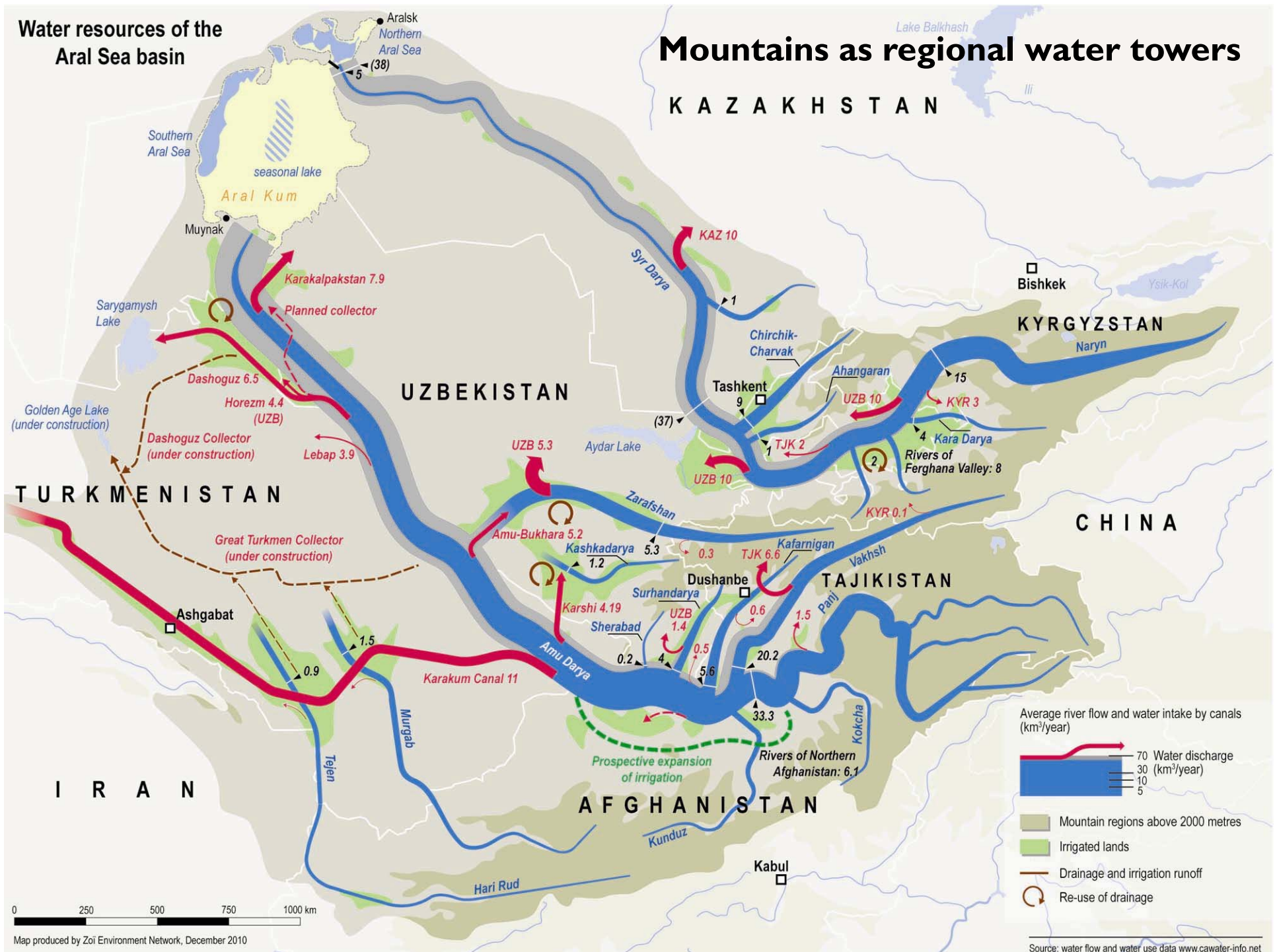
- ▶ Large and high-altitude glaciers are more stable and less affected by climate variability and change
- ▶ Small and low-altitude glaciers are more sensitive to climate variability and change and could disappear in the coming decades
- ▶ Rapid glacier and snow melting cause rising water levels in rivers and lakes; danger to infrastructure (mining, hydropower, irrigation) and communities





## Water resources of the Aral Sea basin

## Mountains as regional water towers





# Natural disasters in Central Asia

- Climate change as additional stress factor, exaggerating risk of natural disasters
- Climate change as multiplayer of threats and social-environmental challenges
- Risk of GLOFs, floods, droughts, wild fires and pest infestations may amplify due to increasing weather instability



## Natural hazards

### Seismic risk



Epicentres of main earthquakes



Landslide risk

Risk of flooding and mudflows

Risk of major avalanches

Glacial lakes and lake outburst flood risk areas

## What countries do?

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- ▶ The governments of Kazakhstan and Uzbekistan are already contributing a vast amount of resources to monitoring and prevention on natural hazards associated with extreme weather and climate change impacts in the mountains (to protect infrastructure and population at risk)
- ▶ More impoverished countries Tajikistan and Kyrgyzstan mainly act just before evident natural hazards or after disaster events and still rely on donors in protecting populations at risk, installing and operating early warning systems

## What countries need?

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- ▶ Additional financial resources for monitoring, forecasting as technical improvements in local and national disaster preparedness and response capacities
- ▶ Strengthening cooperation on exchange of information and real time data as well as learning and sharing lessons with neighboring and global regions
- ▶ Relevant ongoing projects:
  - UNECE Chu-Talas  
<http://www1.unece.org/ehlm/platform/display/ClimateChange/Chu+Talas>
  - World Bank's PPCR TJK:  
<http://www.ppcr.tj>



# Climate change in (Eastern) Europe



Climate change in Europe

-  More precipitation
-  Sea-level rise concerns and affected major cities
-  Impact on mountain regions
-  Negative agricultural changes
-  Present permafrost
-  Less precipitation
-  Changes in ecosystems
-  Forest fires
-  Melting of glaciers
-  Permafrost in 2050



# Climate change in Eastern Europe: impacts, trends and projections

	Belarus	Ukraine	Moldova
Drier climate, desertification, droughts	Medium (In some regions only)	Medium	Serious
Extreme weather events and natural disasters	Medium	Serious	Serious
Availability of water resources, drinking water quality	Medium	Medium	Medium
Food security	Medium (In some regions only)	Medium	Medium
Reduced diversity of flora and fauna	Medium (In some regions only)	Medium	Medium
Waterlogging, salinization and deterioration of soil quality	Medium	Serious	Serious
Social problems, impact on people's health	Medium	Medium	Medium
Security	Medium	Medium	Medium

## Severity



Mild



Medium



Serious



In some regions only

# Temperature and precipitation changes

- ▶ Increasing temperature, “tropical nights”
- ▶ Less and unevenly precipitation
- ▶ Increasing extreme weather events (heavy rainstorms, gales, hail, whirlwind, floods, mudslides etc.)



Temperature



Precipitation



Heatwave summer 2010



# Agriculture and water sectors are the most vulnerable

*Agriculture:* yield increase, but decrease of productivity, yield losses caused by extreme events, earlier vegetation, droughts

*Water:* destructive floods, lack of fresh water, sea level increase, more water for irrigation

*Energy:* unevenly energy use, more energy for condition

*Forest:* change in forest borders, reduce forest productivity, fires

*Biodiversity:* migration of flora and fauna

*Health of people:* increase in cardiovascular, respiratory, infectious and cancer. Malaria?





# Floods: the most adverse effect of climate change in the region



# Reducing vulnerability to extreme floods and climate in the Dniester river basin

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- ▶ ENVSEC (UNECE, UNEP, OSCE, UNDP, REC) project
- ▶ The project aims to expand and further strengthen cooperative management in the Dniester River basin to address cross-border management of floods, taking into account both current climate variability and long-term impacts of climate change on flood risks.
- ▶ Partners: Plenipotentiaries of Ukraine and Moldova, Ministries of Environment, State Water Committees
- ▶ Duration: 3 years
- ▶ <http://www1.unece.org/ehlm/platform/display/ClimateChange/Dniester>



## Recent accomplishments:

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- ▶ Baseline studies for 2 countries (assessment of cc' impacts, collecting data and information, projections development)
- ▶ Modeling and scenario building for 2 selected rivers (frequency and magnitude of extreme floods)
- ▶ Vulnerability assessment (identified the vulnerable areas, economic activities, ecosystems and populations at risk)
- ▶ Floods risk maps (maps with prioritization of measures and areas for actions, different flood risk maps)
- ▶ Adaptation and risk reduction measures (including finance)
- ▶ Improved monitoring and forecast for transboundary floods (4 new automated flow stations and data exchange systems)
- ▶ Capacity building on flood alerts and flood communication





Some examples of local people initiatives and support





Local people' contribution in building the constructions on the river's banks







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Practical work,  
supported by local  
business





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Thank you for attention!

Lesya Nikolayeva, Zoi Environment Network

[lesya.nikolayeva@zoinet.org](mailto:lesya.nikolayeva@zoinet.org)

[www.zoinet.org](http://www.zoinet.org)

