

Nature-Based Solutions for Climate Resilience

From flood risk to living rivers: lessons from the Tashir Climate Bridge

Keynote address

Astghine Pasoyan | Energy Saving Foundation

A CLIMATE IN CRISIS: THE GLOBAL PICTURE



1.55°C

2024: first calendar year above 1.5°C of warming vs pre-industrial



11 of 11

2015–2025 are the eleven warmest years ever recorded



US\$244 bn

Natural-disaster losses in 2025; 92% driven by weather



1.81 bn

People exposed to significant flood risk worldwide

Sources: WMO State of the Global Climate (2025); Munich Re (Jan 2026); World Bank / Rentschler et al. (2022)



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WHAT DRIVES CLIMATE RISK?



Heavier downpours,
heatwaves, drought



Homes, bridges and roads
on floodplains



Degraded riverbanks, weak
preparedness



Losses of lives, livelihoods
and assets



Nature-based solutions reduce all three at once: they slow the hazard, give rivers room away from people, and make ecosystems and communities stronger.

Framework: IPCC AR6 Working Group II (2022)



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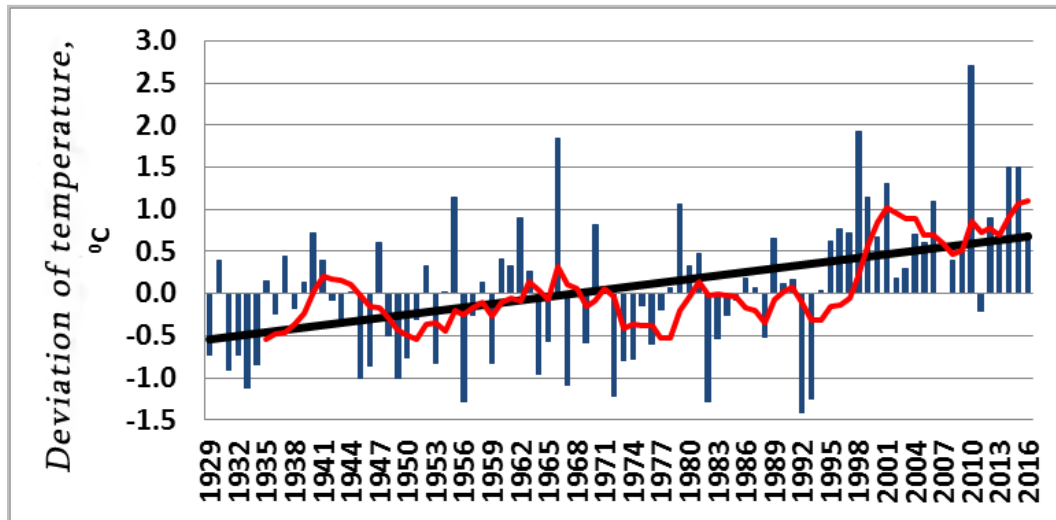


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ARMENIA: A CLIMATE HOTSPOT



Annual temperature deviation from the 1961–1990 normal, Armenia 1929–2016

Sources: Armenia Fourth National Communication (2020); World Bank & ADB Climate Risk Country Profile (2020)

+1.23°C

Observed warming, 1929–2016

–10%

Annual precipitation, 1935–2012

up to +4.7°C

Possible warming by the 2090s under high emissions (RCP8.5)



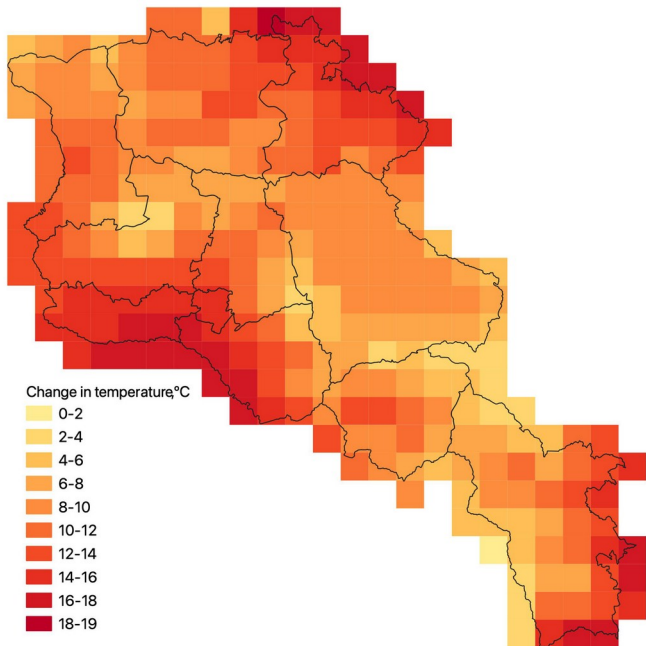
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WHAT IS AT STAKE FOR ARMENIA



Agriculture

US\$107 m lost to drought, frost and floods (2000–05)



Water

Lower river flows, more water stress



Infrastructure

Mudflows hit 200 settlements and 600 road sites (2004–07)



Health

Heatwave probability: 3% today → 18% by 2100



Ecosystems

Desertification, biodiversity loss, wildfires



Energy

Hydropower and grids exposed to heat and drought

Projected temperature change by 2070 vs 1961–1990

Sources: NC4 (2020); WB & ADB (2020); USAID Climate Risk Profile Armenia (2017)



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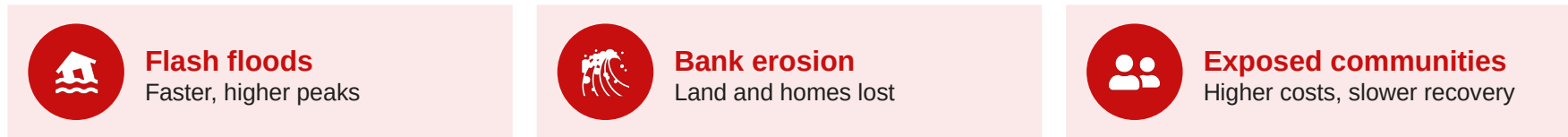
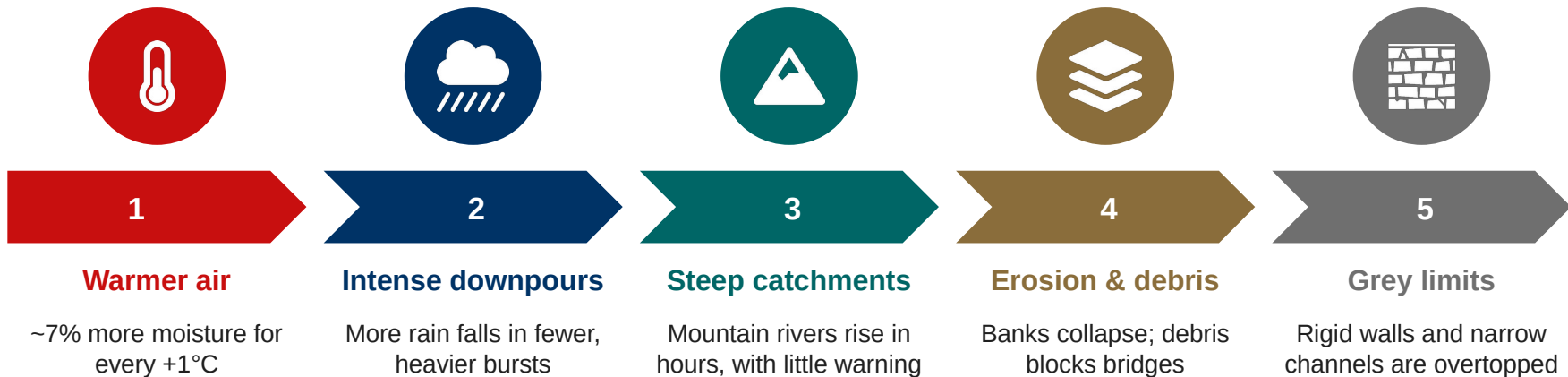
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FLOOD RISK: WHY FLOODS ARE GETTING WORSE



26 MAY 2024: THE FLASH FLOOD



40,839

people affected



4

lives lost



2,382

people evacuated



39

settlements in 9 communities



68

bridges damaged: 24 road, 44
footbridges



41.8 km

of roads, plus 1.8 km of
railway

Source: Multi-sector Initial Rapid Assessment (MIRA), UN Armenia, June 2024



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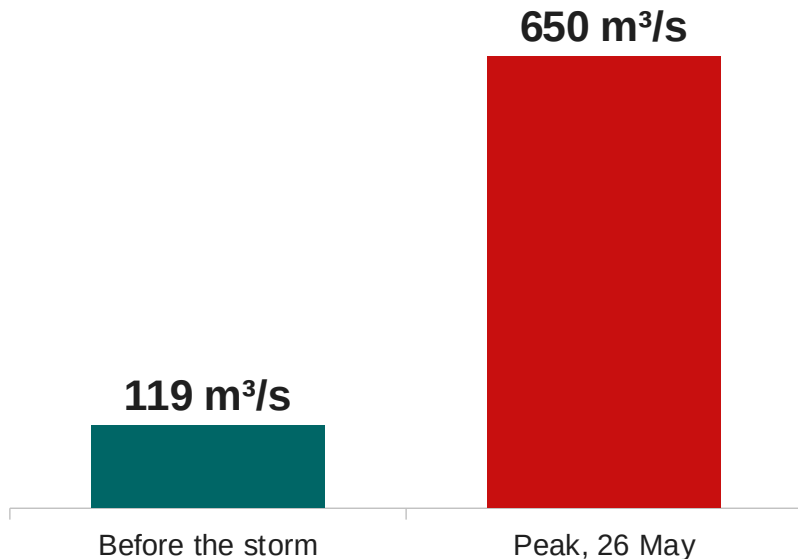
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A RIVER TRANSFORMED IN 24 HOURS



Debed river discharge at Ayrum (m³/s)



Source: MIRA, UN Armenia (June 2024)

x5.5

river flow in a single day



40–55 mm of rain in two days: 40–60% of a normal month



Debed, Tashir and Aghstev rivers burst their banks



Highway bridges and 1.8 km of railway to Georgia damaged



2,453 ha of land left unusable

TASHIR: AMONG THE AFFECTED BY THE DISASTER



~9,700

people affected in Tashir community

~1,000

residents displaced from their homes

262

houses and flats damaged or destroyed

24

bridges hit: 11 vehicle, 13 pedestrian

Grey infrastructure alone could not hold

Source: MIRA, UN Armenia (June 2024), annex data for Tashir



CLIMATE BRIDGE



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PERMANENCE ≠ RESILIENCE

BUILT TO RESIST



Stone and concrete: strong, until a flood exceeds the design

BUILT TO RENEW



Q'eswachaka, Peru: a grass-rope bridge rebuilt every year by four communities for over five centuries

Resilience is the capacity to absorb, adapt and renew: with nature and with the community.

WHAT ARE NATURE-BASED SOLUTIONS?

"Actions to protect, sustainably manage and restore ecosystems that address societal challenges, benefiting both people and biodiversity."

IUCN / UN Environment Assembly (UNEA-5, 2022), abridged



Slow the flow



Store flood water



Clean the water



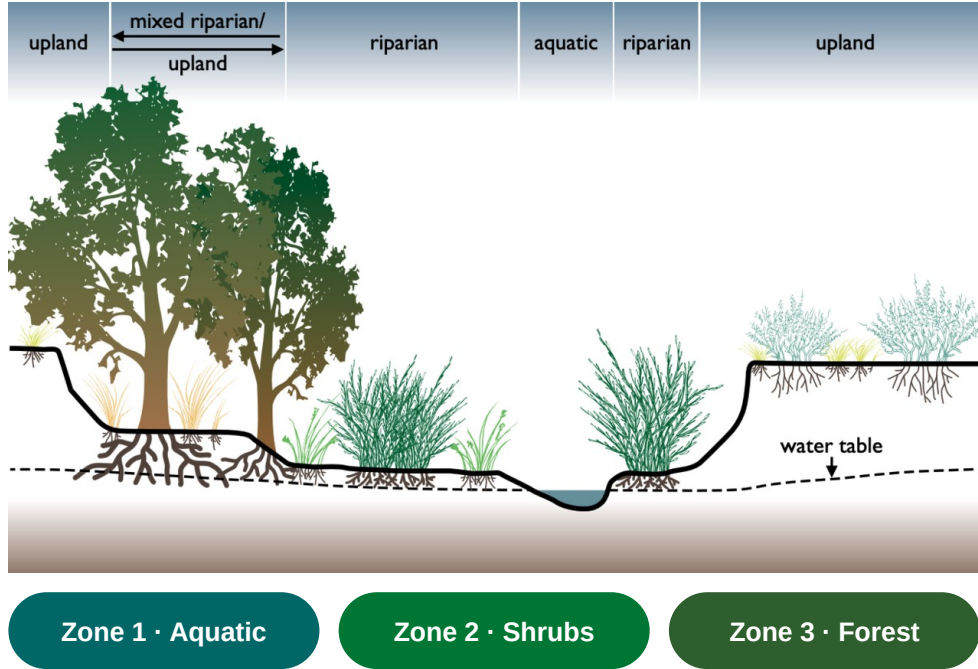
Trap sediment



29%

lower flood peak from restoring wetlands on just 1.5% of a catchment

HOW A LIVING RIVERBANK WORKS



Root reinforcement

Roots bind the soil and resist the river's force



Slower flow

Stems and branches add roughness and cut velocity



Room to spread

Floodplains store water and lower the peak



Living services

Filter pollutants, cool water, shelter wildlife

THE NBS TOOLBOX FOR RIVERS



Riparian buffer strips

Native trees, shrubs and grasses along the bank



Large wood & leaky dams

Logs slow the flow and hold water upstream



Coir logs & geotextiles

Biodegradable toe protection while roots grow



Vegetated gabions

Permeable stone baskets that plants grow through



Wetlands

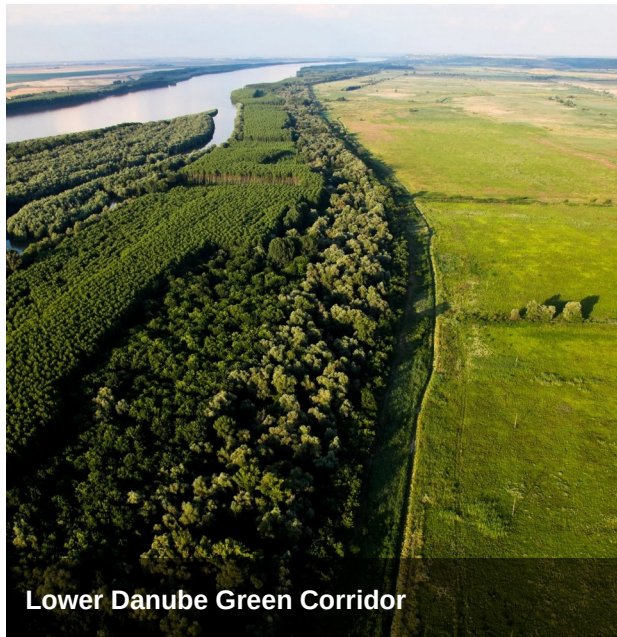
Natural sponges that absorb peak flows



Floodplain reconnection

Room for the river: up to 37% lower peaks

THE EVIDENCE: NATURE DELIVERS AT SCALE



US\$625 m

damage avoided by
coastal wetlands in
Hurricane Sandy, USA

-25%

flood risk on the Rhine
since 1995

60,000+ ha

of Danube floodplain
restored

€111.8 m

per year in ecosystem-
service value, Lower
Danube

-0.9 m

flood levels on the Napa
River after its "Living
River" plan

30%

less flood damage from
riparian reforestation
(WRI)

Sources: ICPR Rhine 2040; WWF Lower Danube; Napa County; Narayan et al. (2017); WRI

THE TASHIR CLIMATE BRIDGE PROJECT



Turning a flood-damaged riverbank into a climate-resilient, thriving corridor



Tashir community, Lori Province: the town plus 23 villages



≈11,500 residents



Host to 297 displaced families (1,149 people) from Artsakh



Pilot: 50–100 m of river corridor and the central bridge



Led by the Energy Saving Foundation with Tashir Municipality



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The baseline



The Vision

From an eroded, flood-damaged riverbank to a living, climate-resilient corridor

NBS FOR THE TASHIR RIVERBED: HYBRID GREEN-GREY

◀ RIVER



Riverbed & toe

Coir logs and riprap protect the toe, where the current is strongest



Bank face

Vegetated gabions: permeable, flexible, earthquake-safe



Upper bank

Live willow stakes and fascines knit the soil together



Riparian buffer

5–30 m of native trees and shrubs



Bridge & public space

Reinforced central bridge, riverside paths and recreation

Targets: +20% water retention · better water quality and biodiversity · a reinforced, flood-ready bridge



Community empowerment

- Training for youth and women
- Volunteers in planting and clean-ups
- Community-led care of banks and bridge

90% of trainees gain new skills



Ecotourism

- Annual "Climate Bridge" Festival
- Riverside paths and recreation
- Culture and heritage of Lori

5 local eco-guides employed per year



Green economy

- New income for local SMEs and guesthouses
- Green jobs in restoration and nurseries
- Revenue reinvested locally

**US\$50,000/yr festival revenue ·
+20% local sales**



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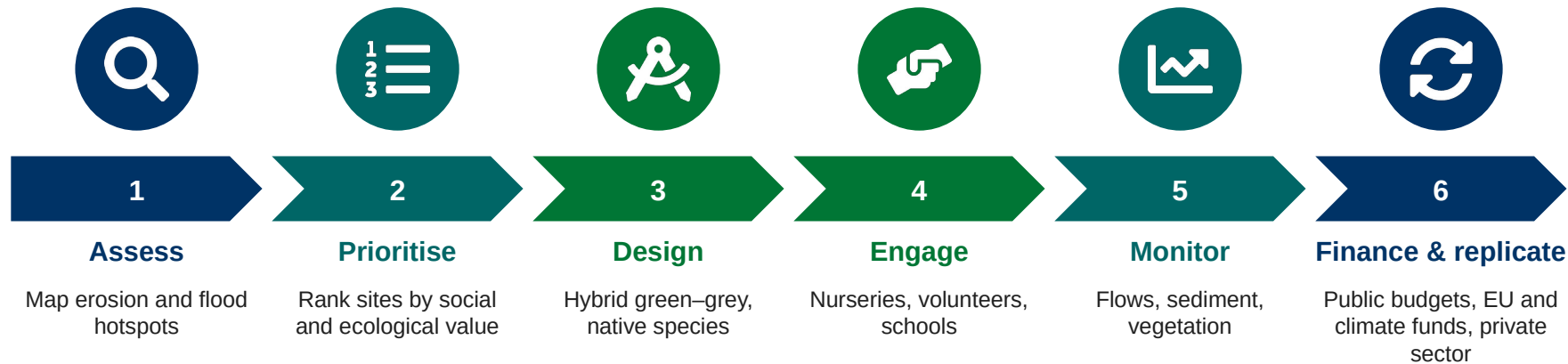


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FROM PILOT TO NATIONAL SCALE



ANCHORED IN NATIONAL POLICY



Armenia's NDC 2021–2030



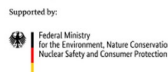
National Adaptation Plan



Model for Armenian urban watersheds



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NATURE-BASED SOLUTIONS FOR CLIMATE RESILIENCE

Work with nature, not against it.

Resilient rivers. Empowered communities. A greener economy.

THANK YOU

Astghine Pasoyan
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