



# Building climate resilience in hilly catchments: The experience of Szilágyi and Gombás catchments

## Püspökszilágy

### LIFE LOGOS4WATERS

**Administration number:** LIFE20 CCA/HU/001604

**The duration of the implementation:** 1 October 2021 – 30 September 2025

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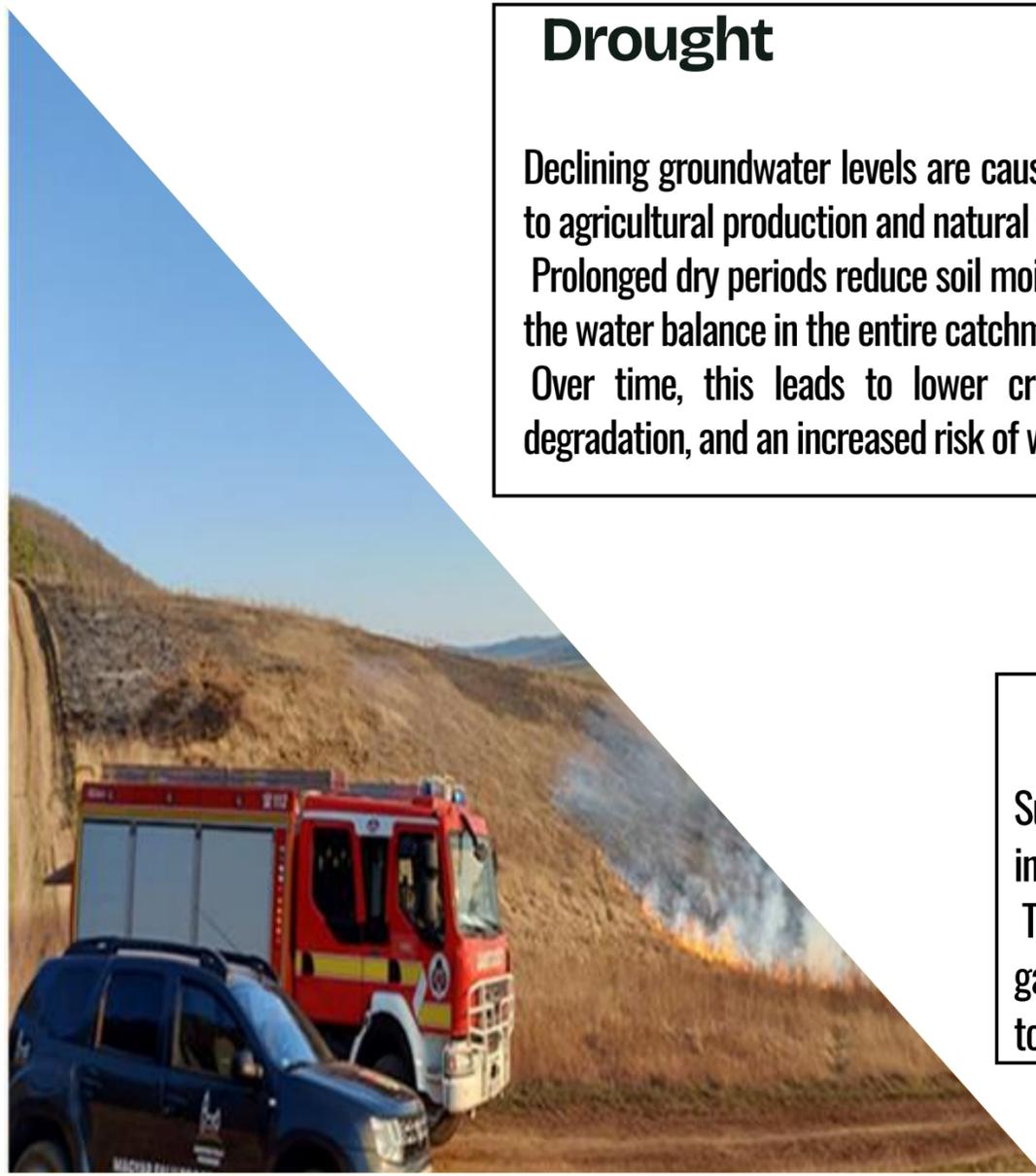
# Location

- **Small rural village in northern Hungary**
- **Located 35 km from Budapest**
- **Situated on the watershed between the Danube and the Tisza rivers**
- **Surrounded by hills and low mountains**
- **Nestled in a narrow valley with streams and forests**
- **Population: around 750 people**
- **Part of a catchment sensitive to both droughts and flash floods**



**Drought**

Declining groundwater levels are causing severe stress to agricultural production and natural vegetation. Prolonged dry periods reduce soil moisture and disrupt the water balance in the entire catchment. Over time, this leads to lower crop yields, forest degradation, and an increased risk of wildfires.



**Floods**

Sudden, intense rainfall events frequently trigger flash floods in the region. These rapidly moving water flows can inundate basements, gardens, and homes within minutes, causing severe damage to residential areas.

# Different level of water

**Caused by Global warming**

While the total annual precipitation has not significantly changed, its distribution has become highly uneven. Rainfall is scarce during late spring and summer, precisely when it is most needed by ecosystems and agriculture. When rain does occur, it often comes in extreme bursts – 70 to 100 mm in a single event – overwhelming the landscape.

# Log Dam Types –

## Natural Flood Control

### Simple log dam



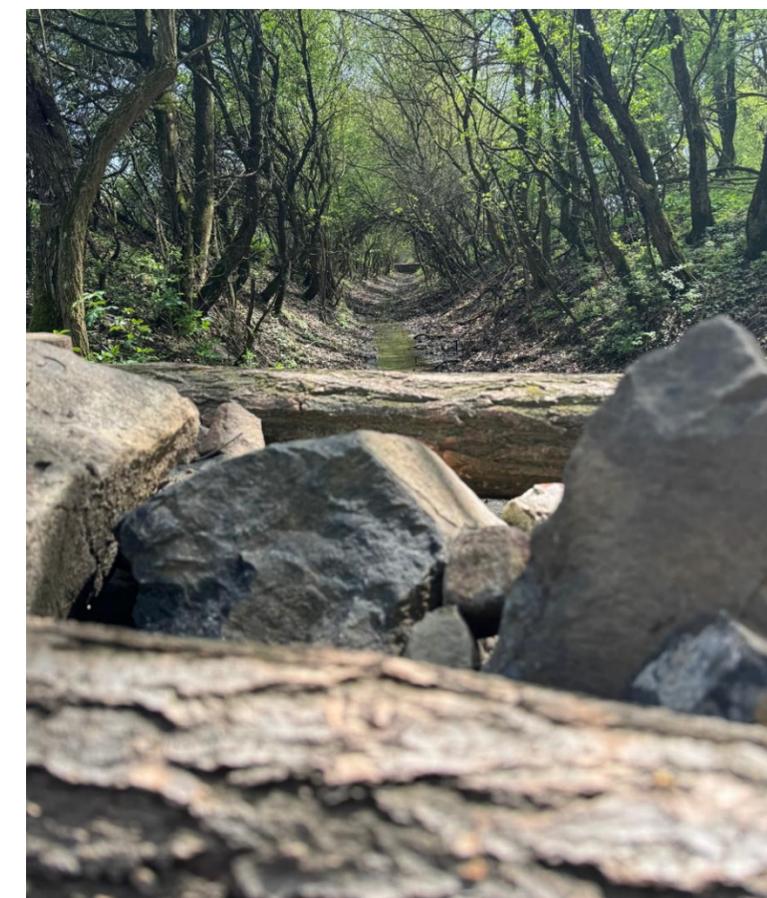
Stronger structure for high-flow periods  
– stabilized with rocks and netting.

More durable under pressure  
Captures larger debris  
Ideal for steep terrain

Easy to build  
Reduces erosion  
Made from local materials

Slows down water and  
traps sediment in small streams.

### Double log dam (Reinforced)



Low-cost and nature-based structures to slow down runoff, reduce erosion, and protect communities from flash floods.



# Log Dam Types –

# Natural Flood Control



**Earth Dam (Embankment Type)**

This log-reinforced earth dam is built using local soil and organic material.

- Slows down runoff and retains water temporarily.
- Suitable for lowland or gently sloped areas.
- Can reduce downstream flood peaks and support groundwater recharge.
- The simple structure can be enhanced with geotextiles or vegetation to reduce erosion.



# BENJES HEDGES &

# NATURAL REINFORCEMENT

“Made from green waste and branches, woven manually with community help.”



**Description:**  
A brushwood hedge built from local green waste, woven manually along small slopes, field edges or near drainage lines.

- Key Benefits:**
- Low-cost, handmade construction using green waste
  - Reduces runoff and slows surface flow
  - Enhances water retention on sloped or compact areas
  - Strengthened with live shrubs, it supports biodiversity and becomes a living barrier
  - Provides habitat and shelter for small animals and insects
  - Contributes to local green waste management – turning cuttings into functional structures

**Construction method:**

- Made by weaving pruned branches and twigs between upright wooden stakes
- Can be reinforced with live cuttings (e.g., willow or hazel) that take root and strengthen over time





# Reservoir – Turning Problems into Opportunities

- This reservoir was built on the site of a former illegal dumping area, transforming a degraded space into a multi-functional water retention zone.
- It captures excess rainfall from the nearby stream via a sluice system and supports groundwater recharge.
- Beyond its technical function, it now serves as a local recreational area, offering a green space for relaxation, nature education and community pride



Penc Téglaházi major I.  
Penc Sziróta II. Penc Sziróta I.  
Kosd/Rád Rádi-patak  
Penc Barina

Püspökszilágy Gombás I. Püspökszilágy Gombás II.

Püspökhatvan Takács-hegy II.  
Püspökhatvan Takács-hegy I. Püspökhatvan Takács-hegy V.

Vácduka árok I.  
Vácduka árok II.  
Vácduka Benjes sövény

Kisnémedi Némedi-patak  
Püspökszilágy Kiskövesi-oldalág I. Püspökszilágy Kiskövesi-oldalág II.

Beltéri bemutatóterem  
II. állomás  
I. állomás  
III. állomás  
IV. állomás

Galgagyörk Putri-patak

Váckisújfalu II.  
Váckisújfalu I.



# Multi stakeholder forum and dissemination

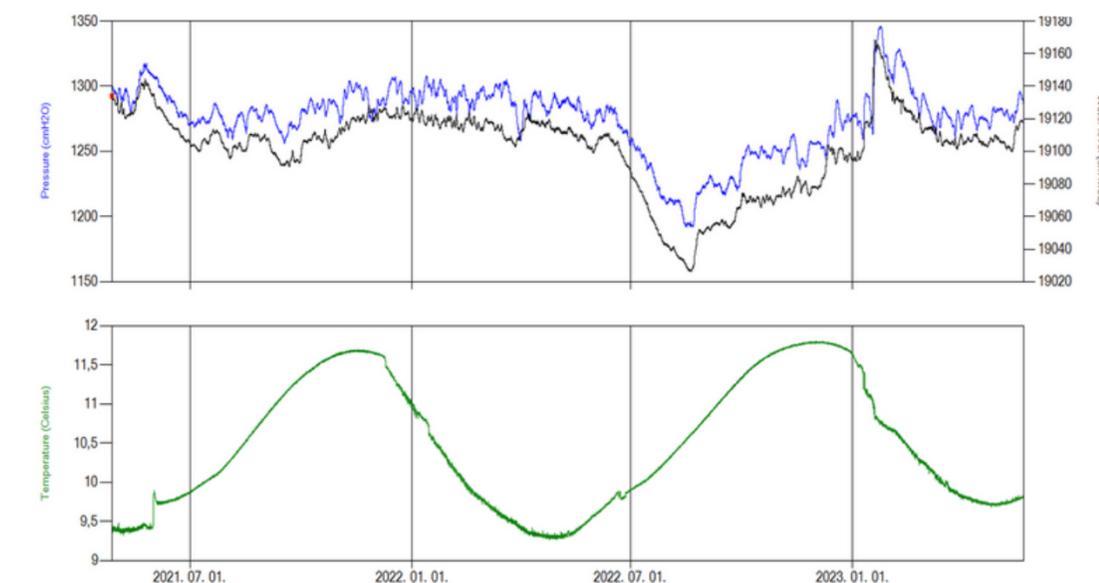


- The Forum's role extends beyond the scope of the project itself — its purpose is to establish a sustainable decision-making platform that also supports future cooperation.
- Its goal is to bring together decision-makers, farmers, local residents, and professionals to exchange ideas and discuss local water-related challenges.
- Anyone could become a member of the Forum and propose potential project sites.
- Out of 26 submitted proposals, 14 were selected for voting (with voting rights), and 6 were chosen for implementation — as decided by the professional advisory board.
- In addition, the Forum plays an important role in raising awareness and shaping mindsets.

# Monitoring system

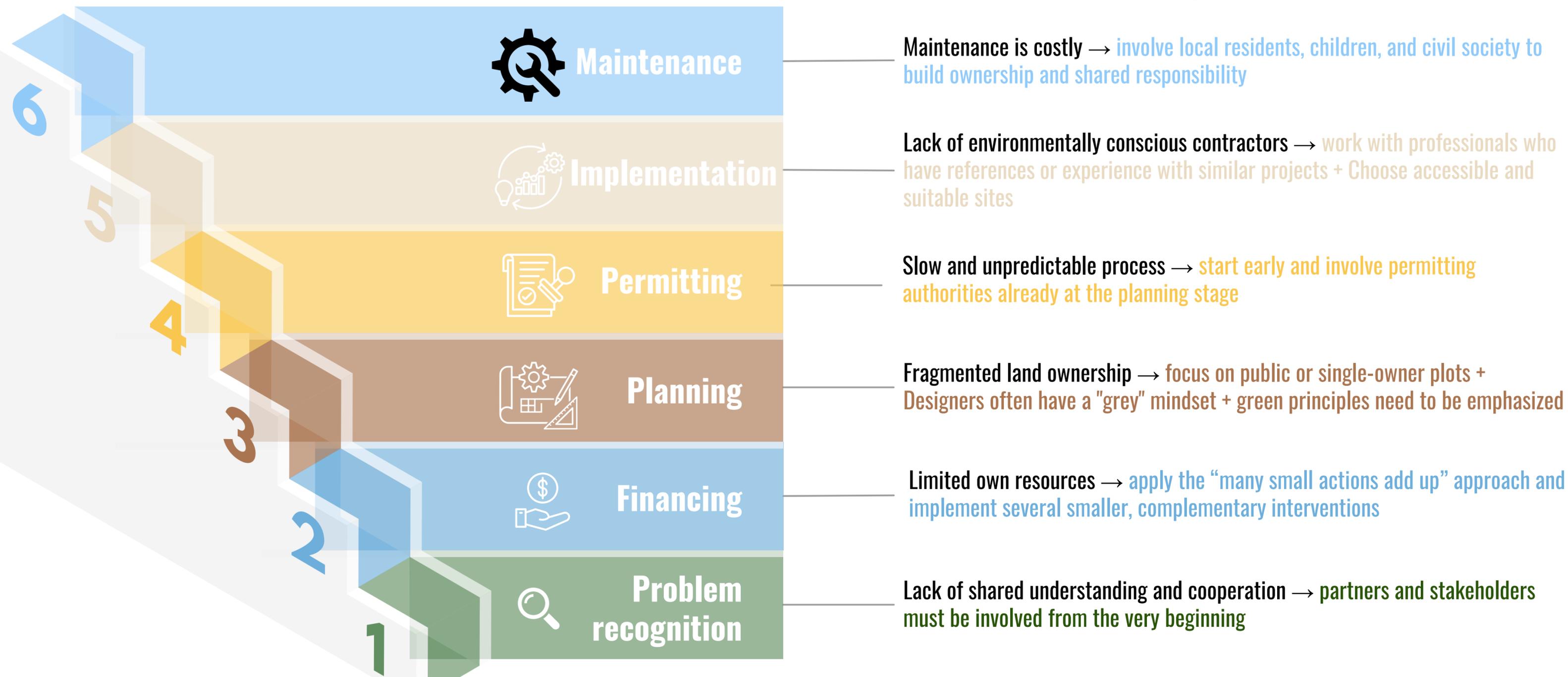
A comprehensive system was established to track the impact of water retention interventions:

- Top left: A streamflow monitoring camera records changes in discharge.
  - Top right: A weather station continuously collects precipitation, temperature, and wind data.
  - Bottom left: Simple wooden rods help us observe sediment accumulation behind log dams.
  - Bottom right: A groundwater monitoring well equipped with a Diver sensor measures water table fluctuations over time.
- This data supports evidence-based planning and the long-term evaluation of project effectiveness.



# What We've Learned Along the Way

Challenge → Lesson



# Thank you for your attention



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