

# 22nd International Conference of EURO-INBO

## Session 3

Adapting to climate change: How to better manage and prevent droughts?

### Local Drought Management through Nature-Based Solutions: Practical Insights from a Cross-Border Basin in Poland and Saxony

Dr. Eng. Mariusz Adynkiewicz-Piragas

Institute of Meteorology and Water Management  
National Research Institute, Poland

22/05/2025, Paganini Congressi, Parma, Italy  
22nd International Conference of EURO-INBO

With the support of:



Inviting authorities:



Partner:



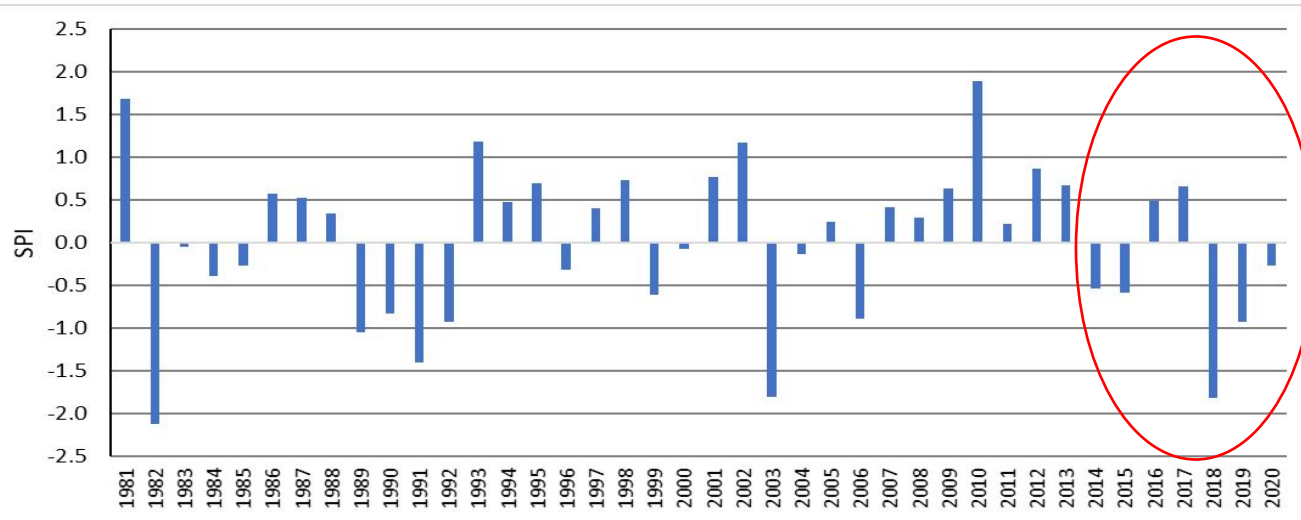


# Context and Climate Challenges

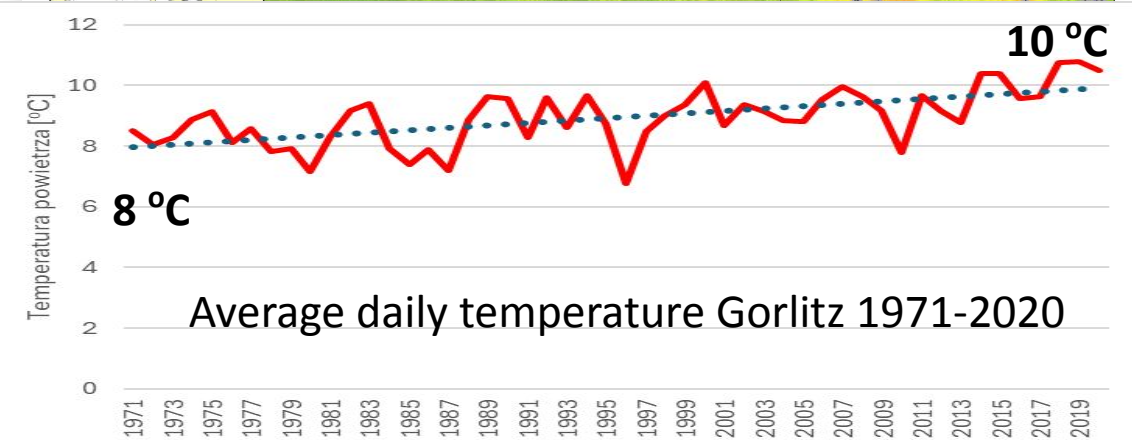
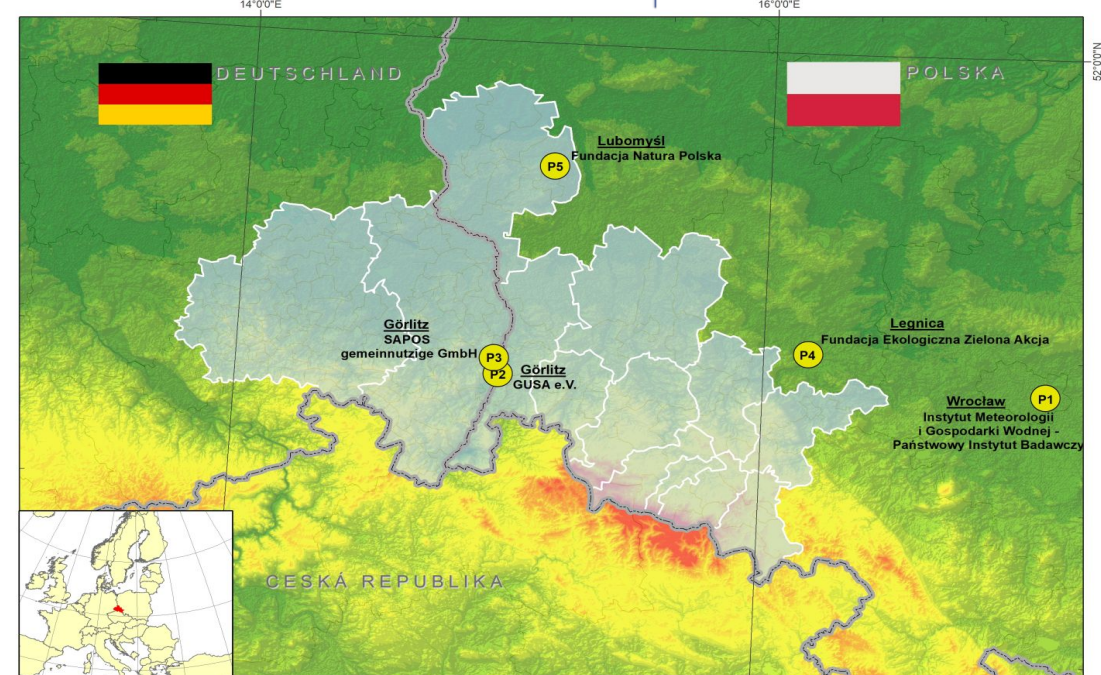
## Drought as a Rising Challenge in Cross-Border Basins



**METEO**  
IMGW-PIB  
meteo.imgw.pl



The Standardized Precipitation Index (SPI) - a drought index 1981-2020 . **1 to 8 low-flow periods** were recorded annually



### How Nature-Based Solutions Prevent Drought

#### Water Retention

Wetlands, ponds, green spaces retain rainwater and slow runoff

#### Soil Infiltration & Moisture

Permeable surfaces and vegetation improve water absorption

#### Microclimate Regulation

Trees and water bodies reduce heat and evaporation

#### Ecosystem Restoration

Renaturalised rivers and wetlands balance local water cycles

#### Reduced Pressure on Infrastructure

Decentralized NBS ease stress on drainage and supply systems in water

#### Climate Resilience

Multifunctional landscapes support long-term adaptation

### Strengths of NBS in Drought Prevention

#### Multifunctionality

- they simultaneously increase water retention, support biodiversity, mitigate heat effects, and improve air and water

#### Local Adaptability

- they can be tailored to specific local landscapes and vulnerabilities

#### Climate Resilience

- They enhance the ability of ecosystems and communities to withstand extreme conditions

#### Community Engagement

- they promote public participation and local ownership in climate adaptation processes.

#### Lower Operating Costs

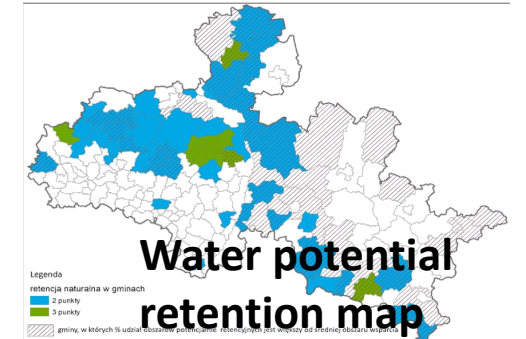
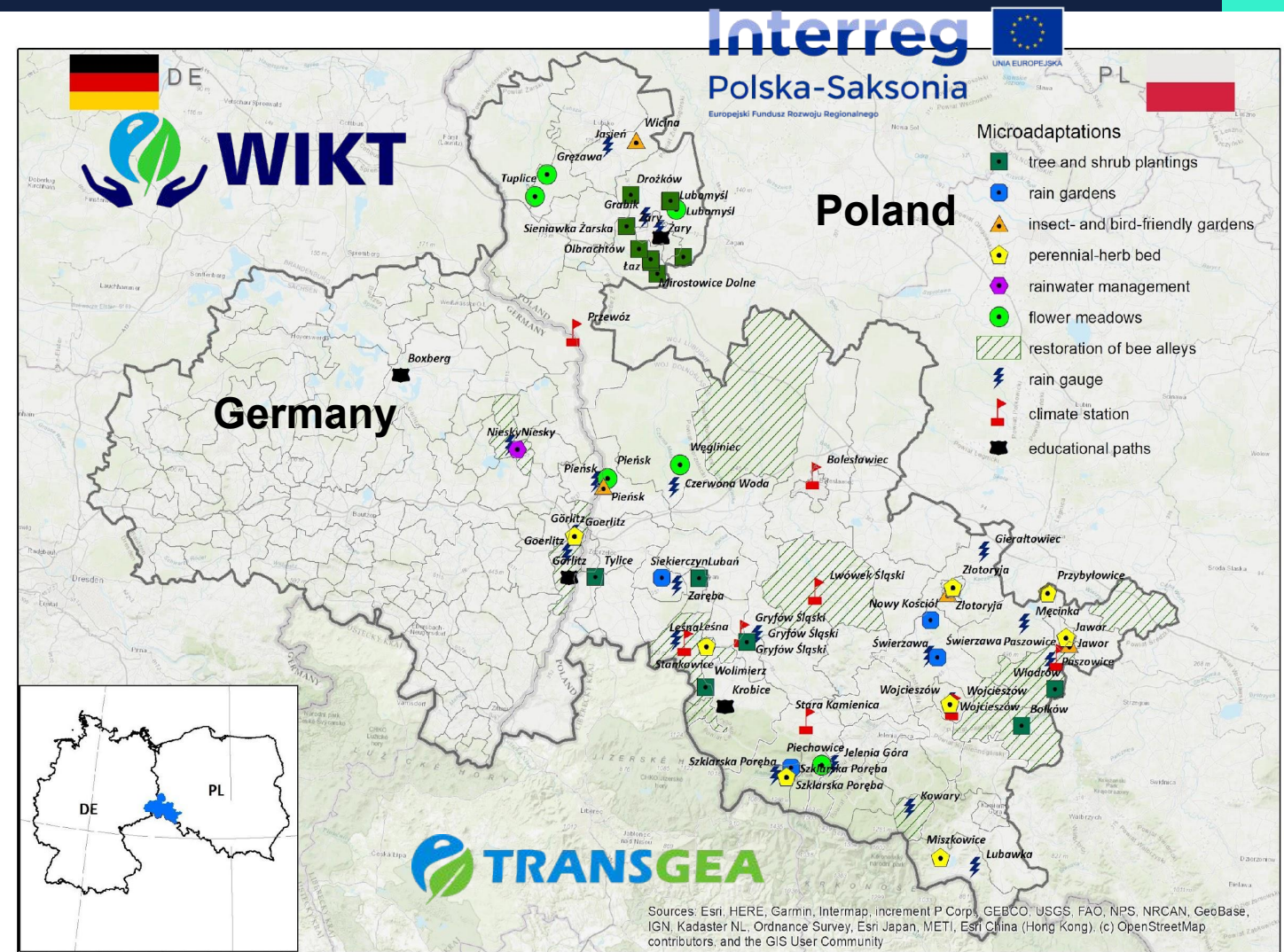
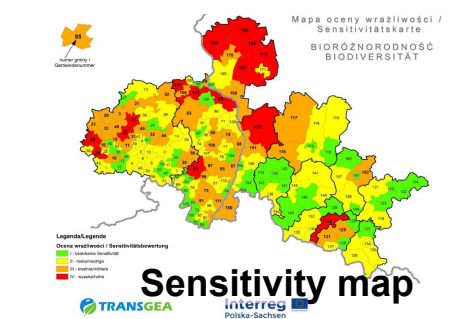
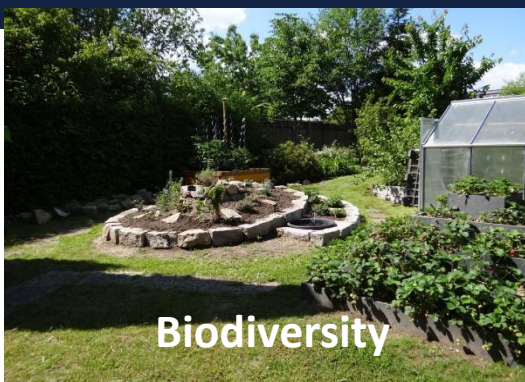
- compared to grey infrastructure like concrete reservoirs.

#### Natural Water Storage

- soils, forests, and wetlands act like “sponges” retaining water for longer periods.



# Projects Experience - NBS Pilot Actions in the Polish–Saxon Border Region



Numerous low-cost adoptions have been realised in the area presented. Including: tree planting, rain gardens, insect- and bird-friendly gardens, perennial and herbaceous beds, rainwater management, flower meadows, educational paths, climate stations, and rain gauges. In addition, sensitivity and potential retention maps were developed.



## Examples of Hard (technical) low-cost NBS measures – based on physical interventions in ecosystems:

### Tree planting:

- Increase soil water retention
- Shade the soil and reduce evaporation
- Cool adjacent areas
- Increase atmospheric humidity



### Perennial herb beds:

- They retain water locally
- Improve the microclimate
- Increase humidity
- These are drought-resistant plants

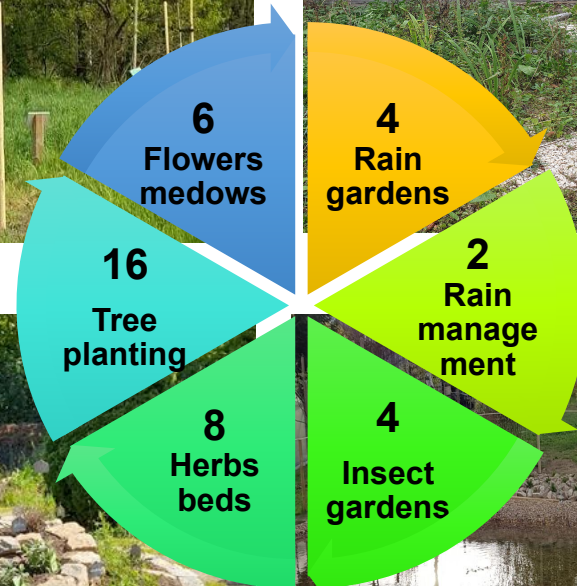


### Rain gardens:

- Collect water
- Slow down runoff
- Store water for dry periods
- Support small-scale retention

### Water biotopes:

- Retain water in the landscape
- Support groundwater replenishment
- Increase resistance to lack of rainfall
- Regulate natural hydrological processes



To monitor the local climate, eight meteorological stations and 20 rain gauges have also been installed.



Examples of 🧠 Soft (non-technical) measures – enabling and supporting NBS

**Stakeholder engagement and participatory planning:**  
climate picnic, study visit

**Capacity-building workshops**

Workshop: hydromorfology and biodiversity, planting



3500  
PERSONS

100  
EVENTS

44  
STUDIES

**Awareness-raising and environmental education**

Educational pathways

Outdoor exhibitions

**Policy recommendations and strategic planning tools – debates in municipalities**





### Integrated mapping and vulnerability assessment are crucial

- Developing vulnerability maps and retention potential maps across multiple sectors allows targeted action. It helped identify priority areas most at risk from drought and climate change
- ➔ **Lesson: Spatial planning based on ecological and hydrological data increases the precision and efficiency of adaptation measures**

### Multi-sectoral collaboration is a success factor

- Close cooperation between local governments, environmental agencies, research institutions, and civil society enabled a better understanding of local needs and the co-creation of solutions
- ➔ **Lesson: Cross-sectoral and cross-border collaboration improves social acceptance and implementation capacity of NBS.**

### GRreen infrastructure enhances urban resilience

- Small-scale interventions such as tree planting, rain gardens, flower meadows, and rainwater management improved local microclimates and slowed water runoff.
- ➔ **Lesson: NBS can be low-cost yet highly effective tools, especially in urban or peri-urban drought-prone areas.**

### Soft measures support sustainability

- Awareness campaigns, training for municipal staff, and participatory planning sessions increased understanding of drought risks and NbS benefits
- ➔ **Lesson: Soft measures (education, capacity building, engagement) are essential complements to technical NBS and ensure long-term impact.**

### Monitoring and evaluation need to be strengthened

- Although NBS are being implemented, long-term data collection and impact measurement remain a challenge
- ➔ **Lesson: Future actions should integrate better monitoring frameworks to quantify ecosystem services and guide adaptive management.**



# Dziękuję / Thank you

Dr. Eng. Mariusz Adynkiewicz-Piragas

22/05/2025, Paganini Congressi, Parma, Italy  
22nd International Conference of EURO-INBO



With the support of:



Inviting authorities:



Partner:



Instytut Meteorologii i Gospodarki Wodnej – Państwowy Instytut Badawczy  
Institute of Meteorology and Water Management – National Research Institute

01-673 Warszawa, ul. Podleśna 61 | tel.: +48 22 569 41 00 | fax: +48 22 834 18 01 | e-mail: [imgw@imgw.pl](mailto:imgw@imgw.pl) | [www.imgw.pl](http://www.imgw.pl)

Regon: 000080507 | NIP: 525-000-88-09