



Drought indices and impacts in the Alpine space (ADO project)

Andreja Sušnik & Gregor Gregorič
on behalf of ADO consortium

Slovenian Environment Agency (ARSO)

EDORA kick-off meeting, 17 June 2022

“Same eyes“ on drought development



- Cross-border agricultural droughts in Danube Basin lowlands → DriDanube project
- Drought Watch = open online tool for cross-border drought monitoring through different drought indices:

Interactive

Multiple functionalities to view and examine data

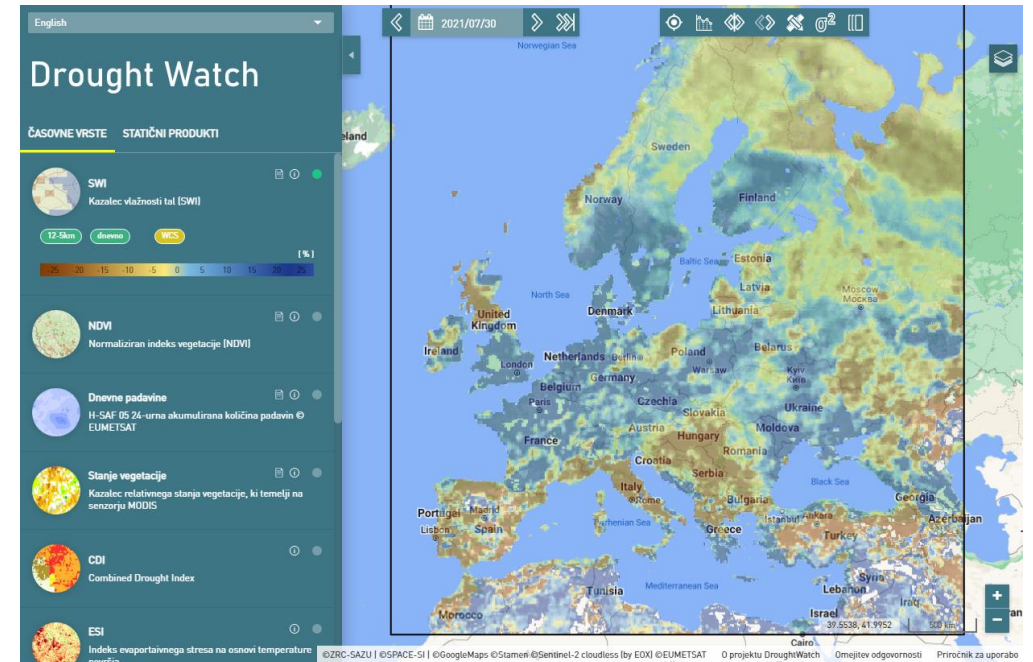
Satellite, reanalysis data

Agri drought (lowlands)
 Potential to cover hydrological aspect

Near-real-time information
 Indices refreshed daily, weekly or every 10 days



www.droughtwatch.eu



NETWORKING



European Academy of Bolzano
(Italy)



Institute for Development of Local
Potentials (Slovenia)



Environment Department (Italy)



Central Institute for Meteorology
and Geodynamics, Climate Research
Department (Austria)



National Association of Consortiums
for the Management and Protection
of the Territory and Irrigation Waters
(Italy)



Faculty of Environment and Natural
Resources, Environmental Hydrological
Systems (Germany)



Slovenian Environment Agency,
Meteorological and Hydrological Office
(Slovenia)



Swiss Federal Institute for Forest, Snow
and Landscape, Mountain Hydrology and
Mass Movements (Switzerland)



Slovene Chamber of Agriculture and
Forestry, Institute of Agriculture and
Forestry Maribor (Slovenia)



Office of the Upper Austrian Government,
Water Management Planning (Austria)



French National Research Institute for
Agriculture, Food and the Environment
(France)

Project consortium

Project duration

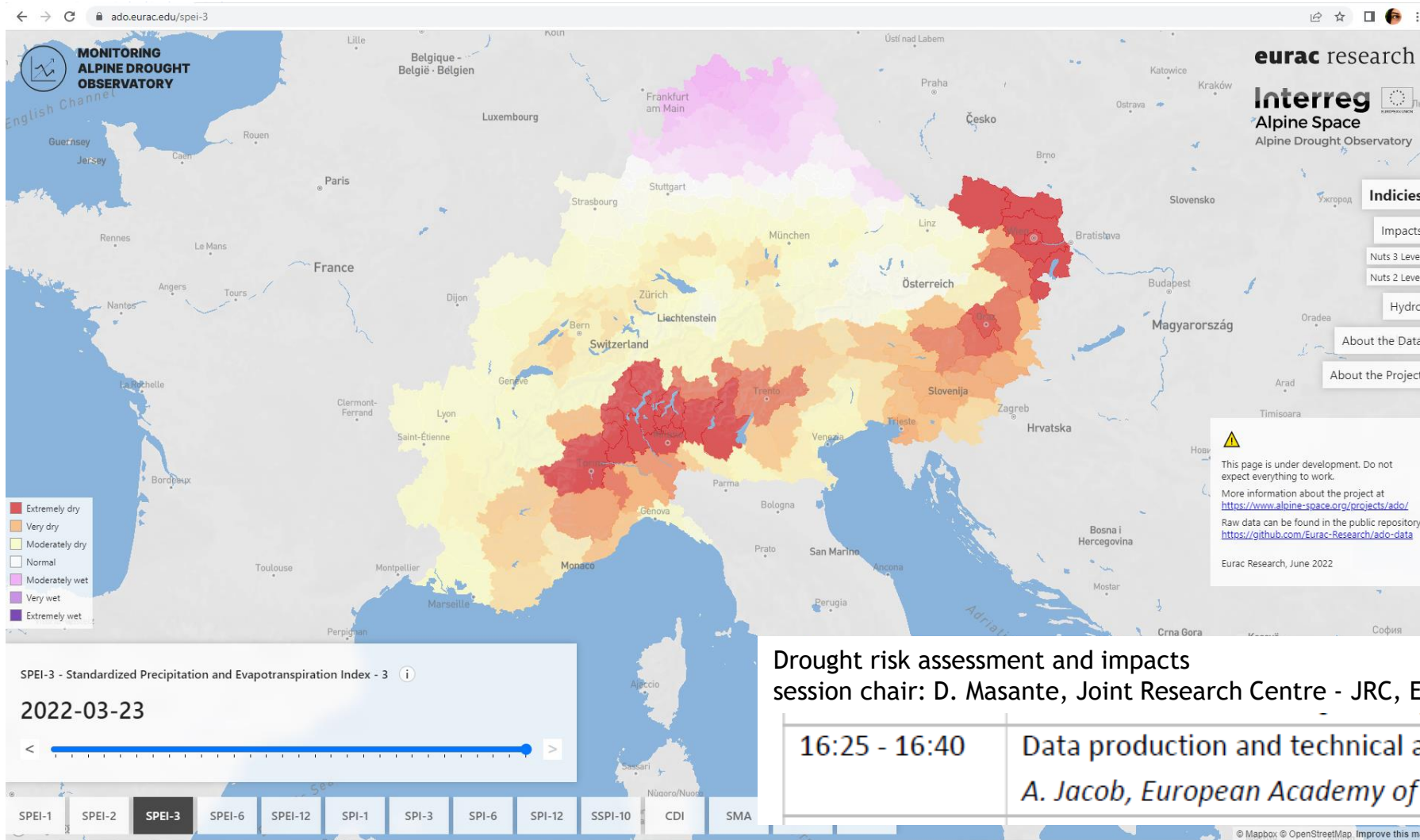
Start: Oct. 2019

End: Sept. 2022



Output 1 - ADO platform

technical aspects provided in the presentation on June 16



<https://ado.eurac.edu/>

Drought risk assessment and impacts
session chair: D. Masante, Joint Research Centre - JRC, EC

16:25 - 16:40

Data production and technical aspects of the Alpine Drought Observatory
A. Jacob, European Academy of Bozen - EURAC, Italy

Drought indices in the ADO platform

Drought products tailored for the Alpine area

ATMOSPHERE



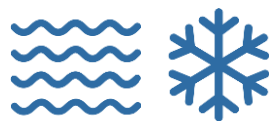
TOP-SOIL



VEGETATION
CONDITION



SURFACE WATER
GROUNDWATER



1. Precipitation Anomalies (%)
2. Standardised Precipitation Index (SPI)
3. Standardised Precipitation-Evapotranspiration Index (SPEI)
4. Soil Moisture Anomalies
5. Normalized Difference Vegetation Index (NDVI)
6. Vegetation Health Index (VHI)
7. Standardised Snowpack Index (SSPI)
8. Hydrological Indices (SDI, Q347, ...)

Partners responsible for the task

eurac
research

 REPUBLIKA SLOVENIJA
MINISTRSTVO ZA OKOLJE IN PROSTOR
AGENCIJA REPUBLIKE SLOVENIJE ZA OKOLJE

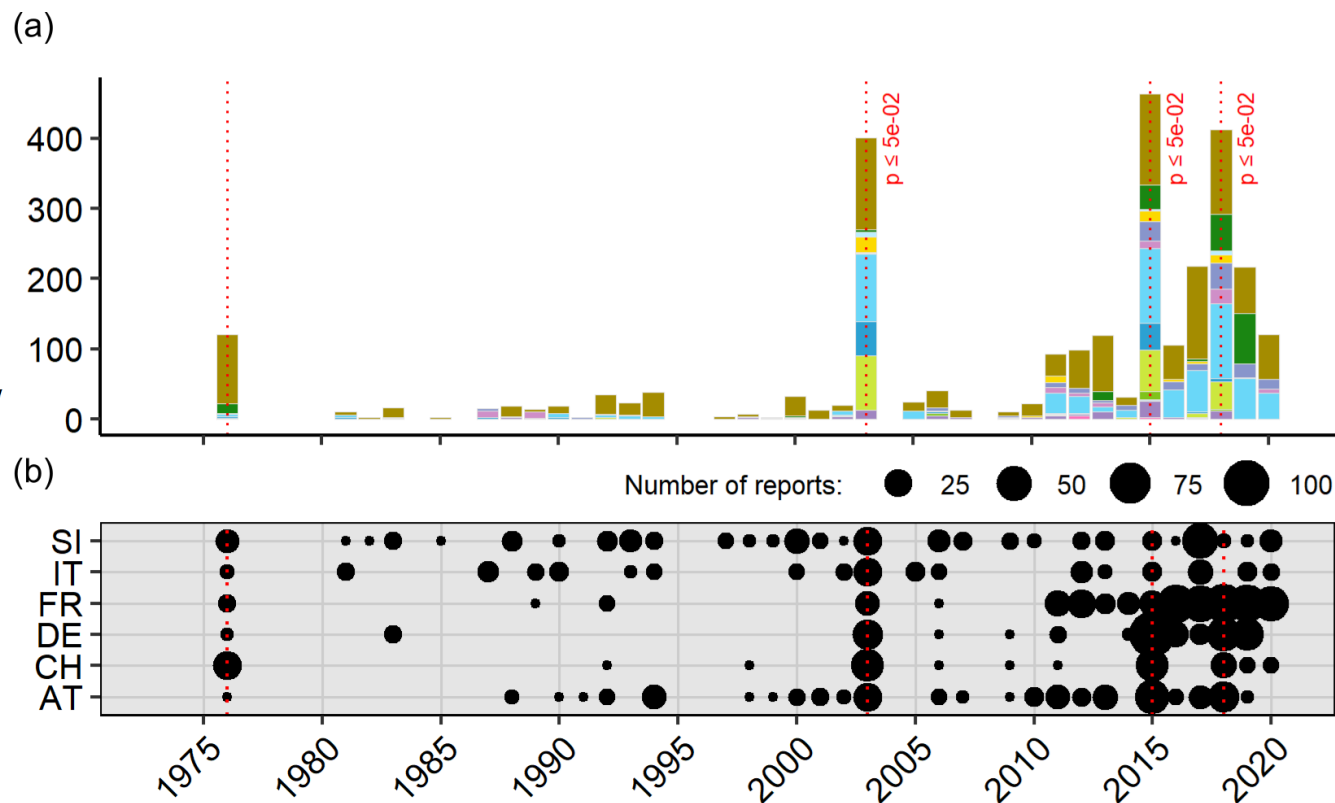
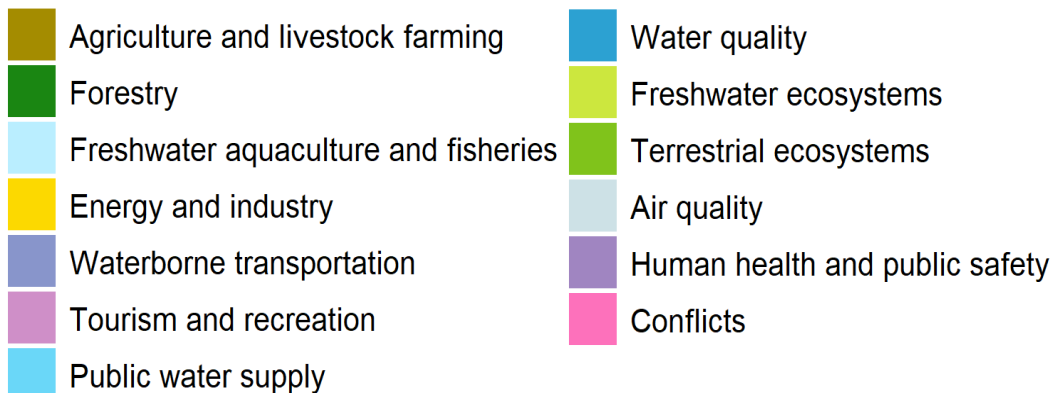


INRAE



Combined drought index?

Output 2 - Alpine drought impacts database (EDII_{ALPS})

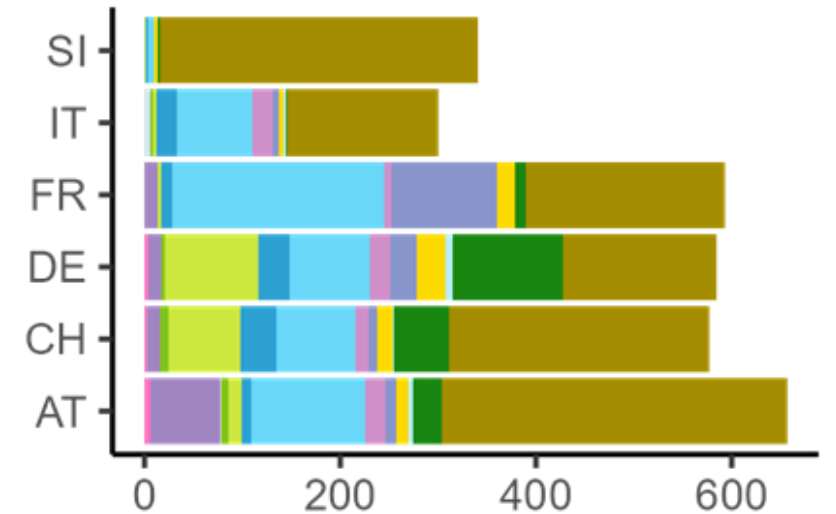
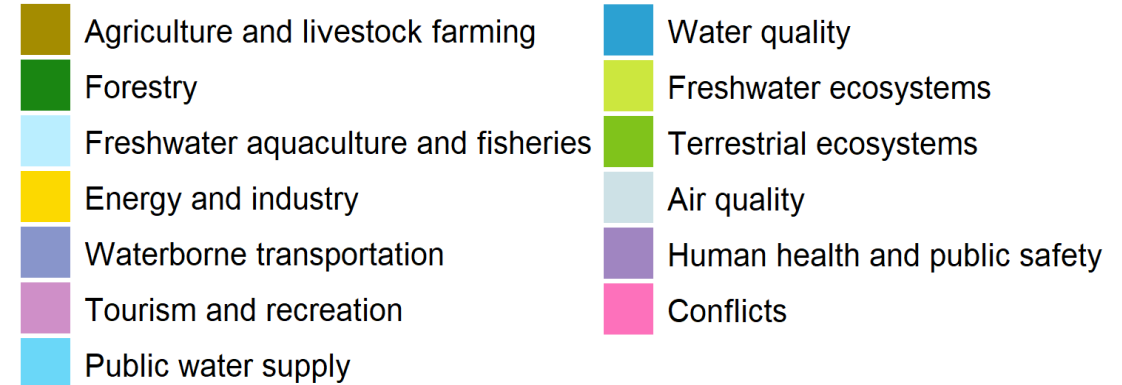
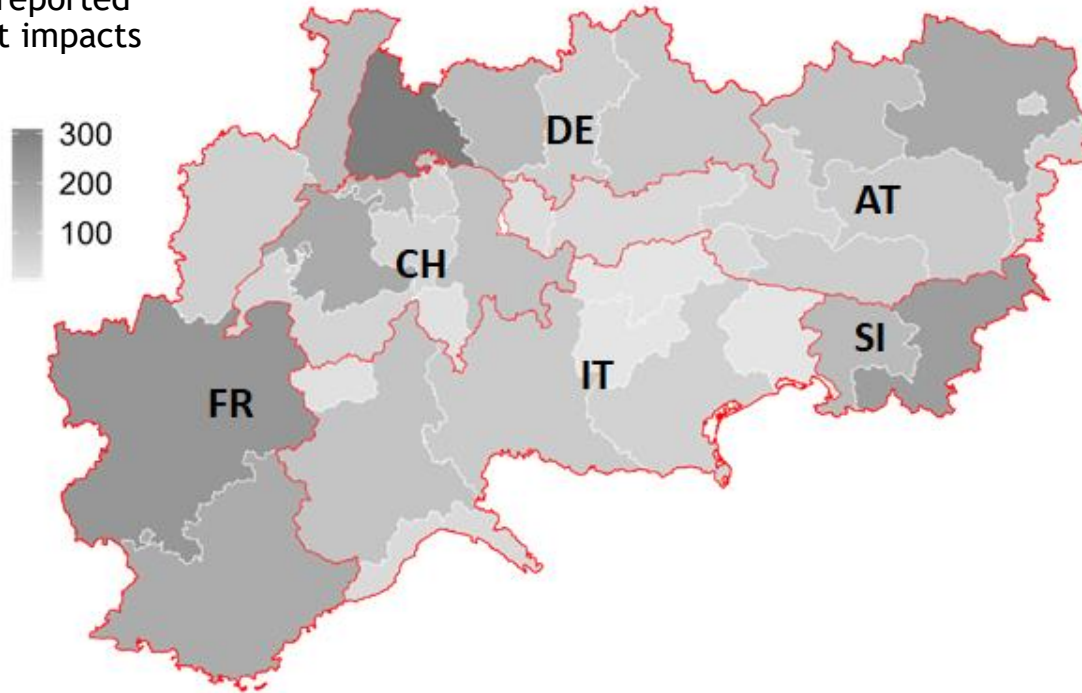


- After 2000, increasing number of reported impacts
- Substantially more impacts in 1976, 2003, 2015, 2018

Partner responsible for the task

Spatial distribution

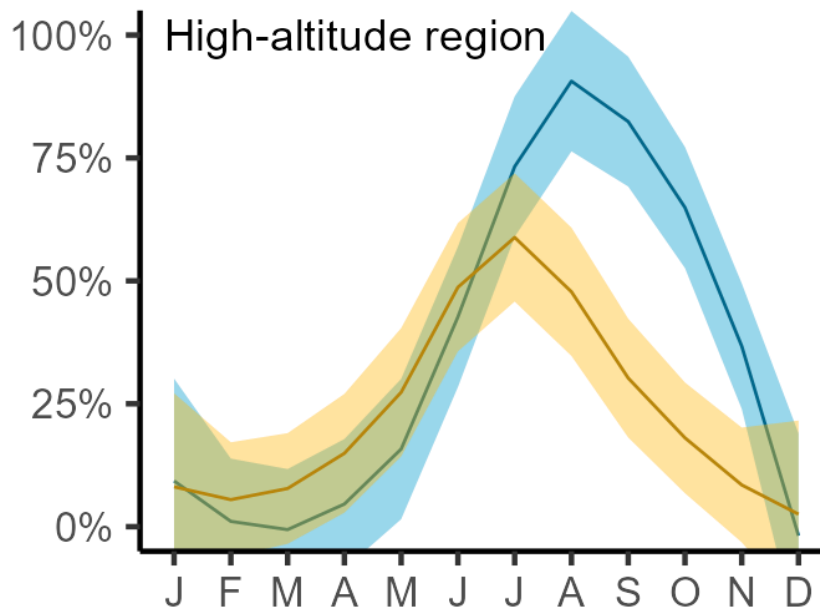
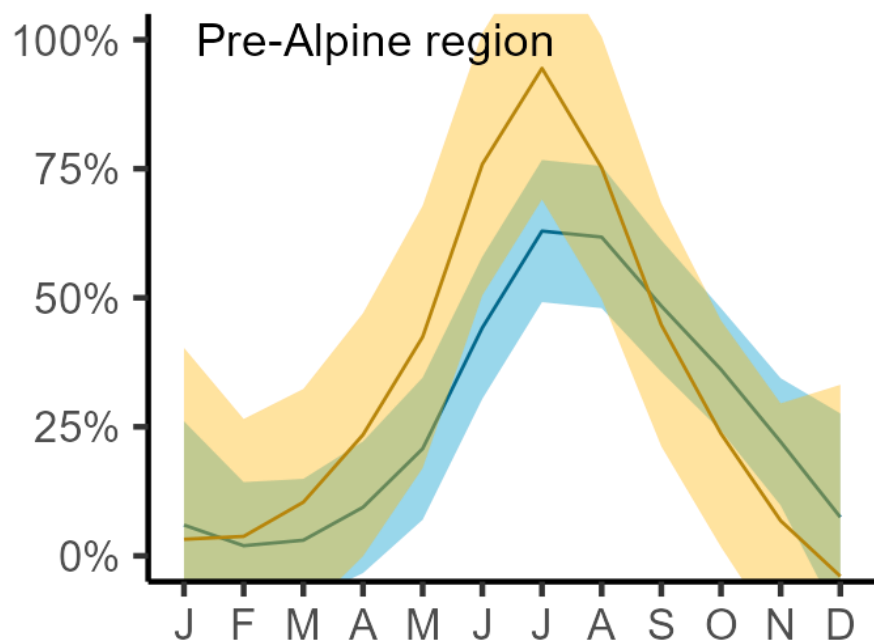
No. of reported drought impacts



- Spatial heterogeneity
- Dominance of impacts on agriculture and water supply

Soil and vegetation vs. Hydrology impacts

-- delayed response



Soil Moisture Drought Impacts (SMD)

Hydrological Drought Impacts (HD)

- Hydrological drought impacts with delayed onset and offset
- More soil moisture drought impacts in spring and more hydrological drought impacts in autumn

Output 3 - Vulnerability to agri drought impacts

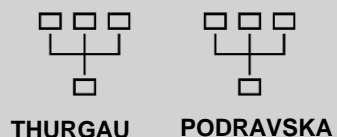
QUALITATIVE ANALYSES

✓ Thurgau
 ✓ Podravška

Defining vulnerability context

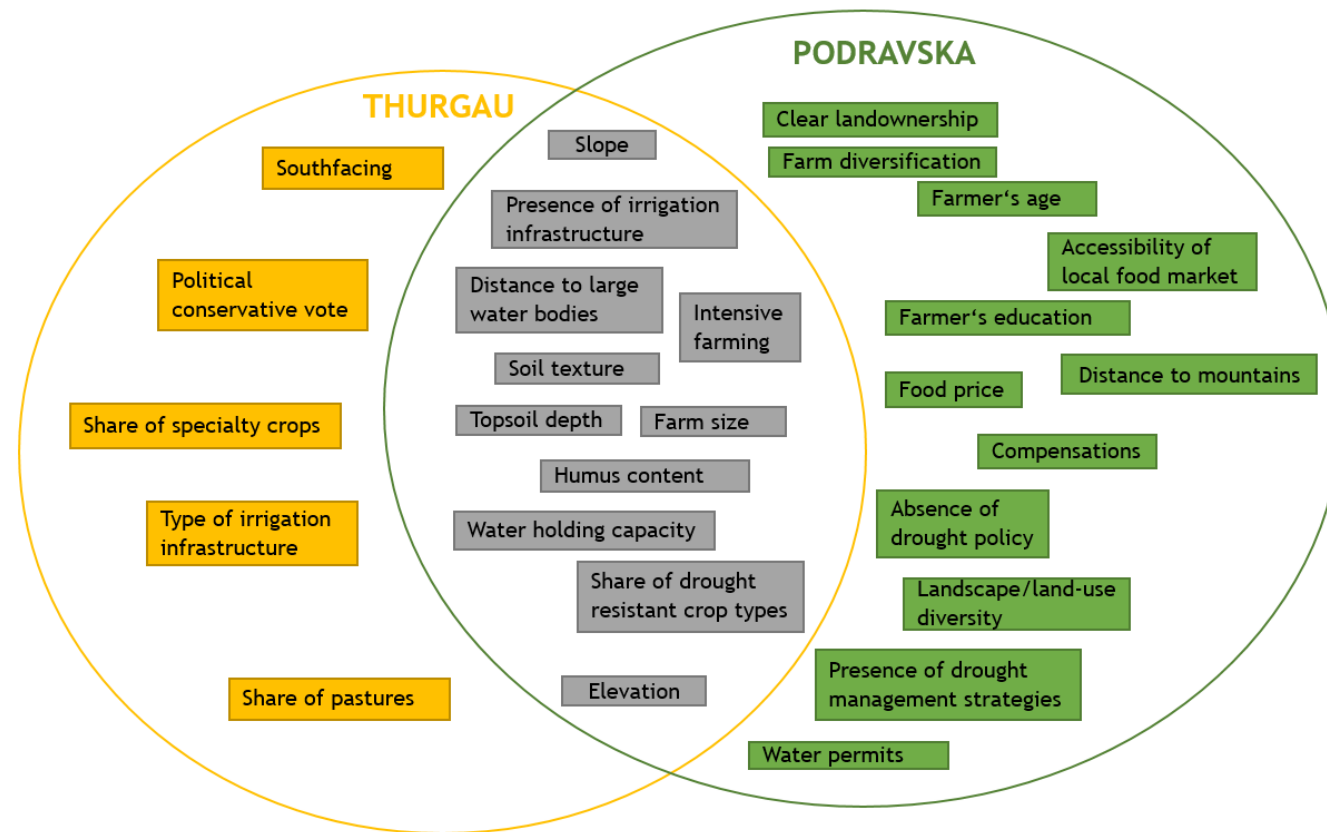
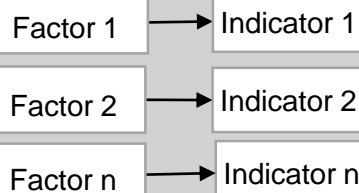
Selection of experts

Development of Impact Chains



Identifying vulnerability factors

- Semi-structured interviews:**
1. Factor identification
 2. Factor weighting
 3. From factors to indicators

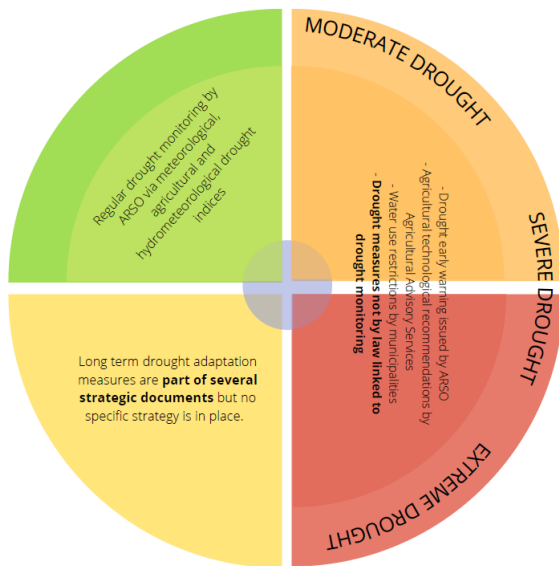


Drought management in Slovenia

Legislation and strategic framework:

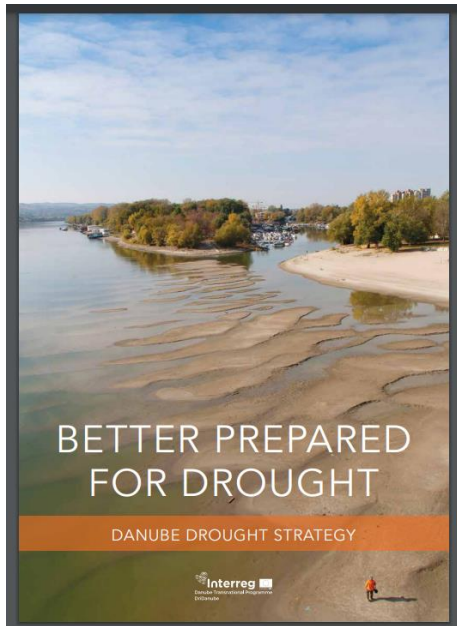
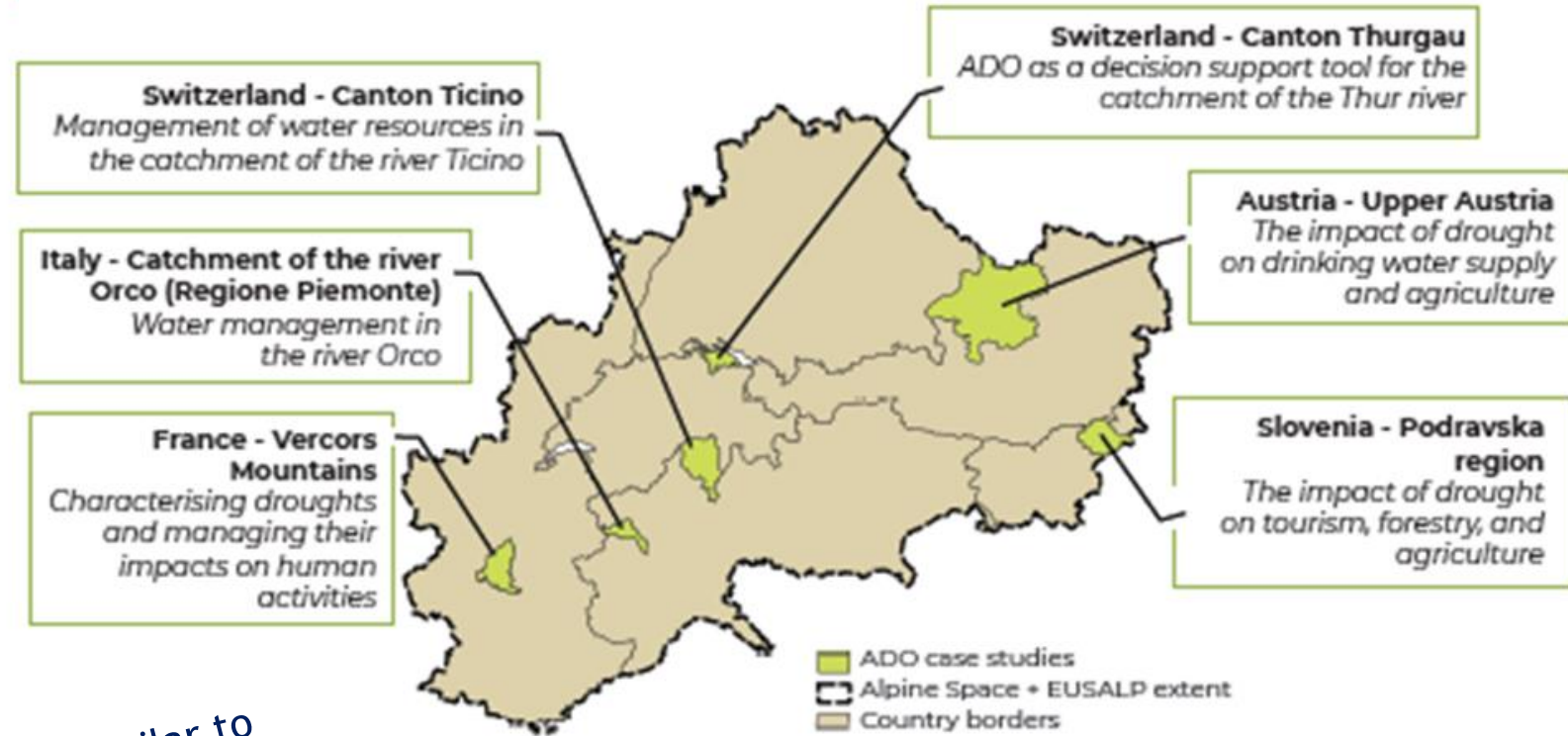
National River Basin Management Plans based on WFD
 Protection Against Natural Disaster Recovery Act
 Strategic Framework for Climate Change Adaptation

Tools available to the public in Slovenia:
 weekly Bulletin Sušomer
 Agrometeorological forecast DroughtWatch.eu



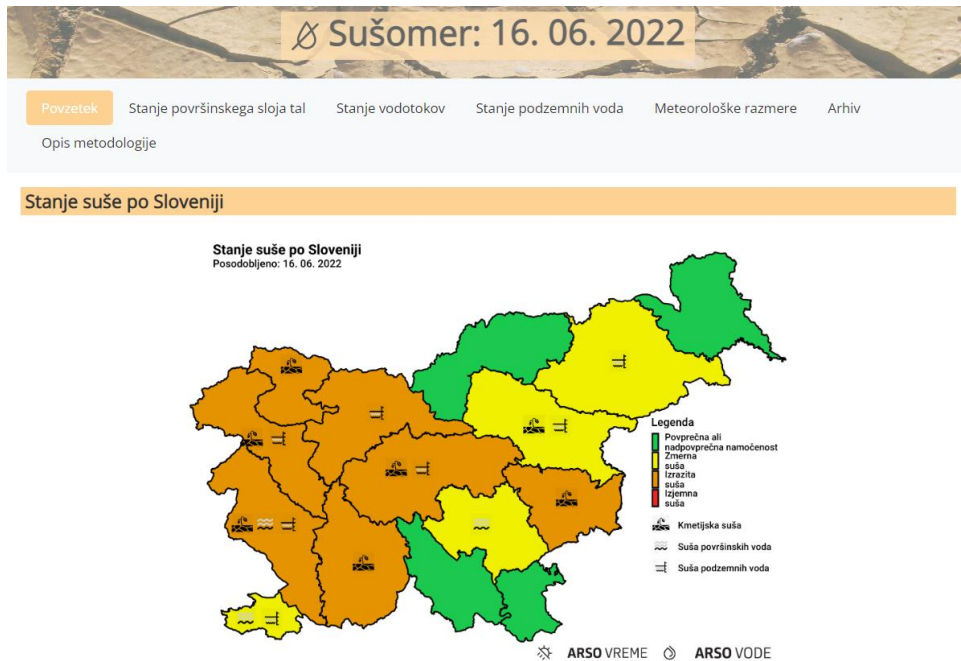
This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space programme

Output 4 - Seeking better drought management solutions



Something similar to

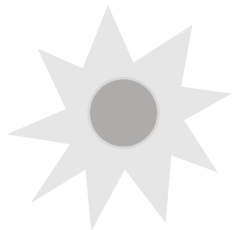
Drought monitoring and EWS in Slovenia: „Droughtmeter“



- Tool for disseminating drought info to the public
- The same spatial and temporal display of each type of drought:
 - State of drought in 15 meteo regions of Slovenia
 - Updated every Thursday afternoon
- Link: <https://meteo.arso.gov.si/uploads/probase/www/agromet/bulletin/drought/sl/>

Icon	Type of drought	Index in use
	Agricultural drought - state of the top soil layer	30-day accumulated Surface Water Balance (precipitation minus potential evapotranspiration)
	Hydrological drought - surface waters	30-day moving average River discharge
	Hydrological drought - groundwaters	30-day moving average Groundwater level

Drought level	Percentile analysis for EWS - thresholds			
	Agricultural drought	Hydrological drought in surface waters	Hydrological drought in groundwater	
	Average or wet conditions	< 65	<75	<75
	Moderate drought	65 - 85	75 - 95	75 - 95
	Extreme drought	85 - 95	> 95	> 95
	Exceptional drought	> 95 + confirmed by the expert	100 + confirmed by the expert	100 + confirmed by the expert



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<https://www.alpine-space.eu/projects/ado/en/home>

Andreja Sušnik
Slovenian Environment Agency (ARSO)
Drought Management Center for SEE (DMCSEE)
Chair of WMO ET Drought Group

E-mail: andreja.susnik@gov.si