



GLOBAL WORKSHOP  
ON BUILDING CLIMATE - RESILIENCE THROUGH  
IMPROVING WATER MANAGEMENT AND SANITATION  
AT NATIONAL AND TRANSBOUNDARY LEVELS

29 - 31 March 2021, hybrid  
Palais des Nations, Geneva and online

**Water Safety Plans and climate resilience**

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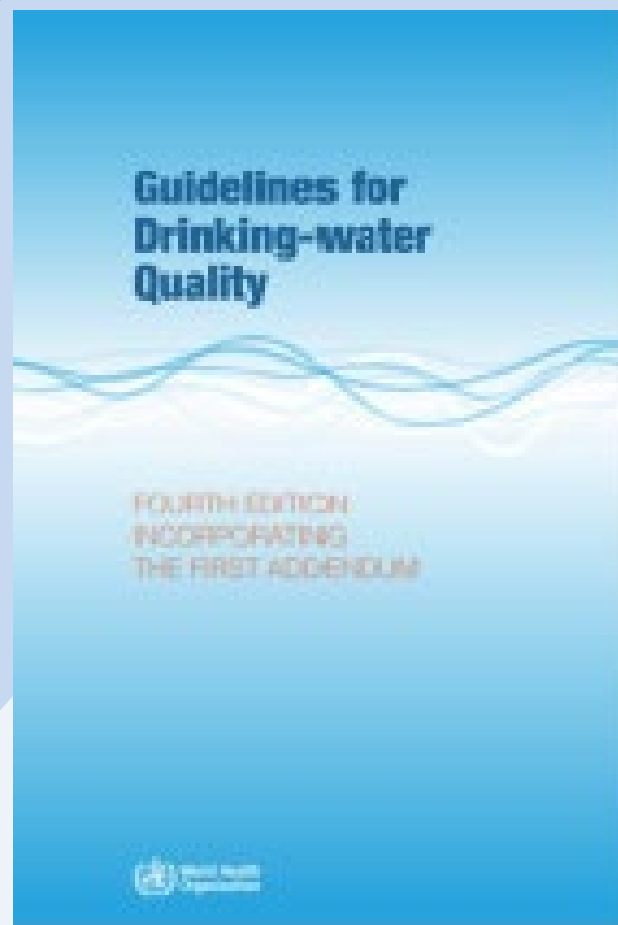


Water Convention/  
Protocol on Water&Health

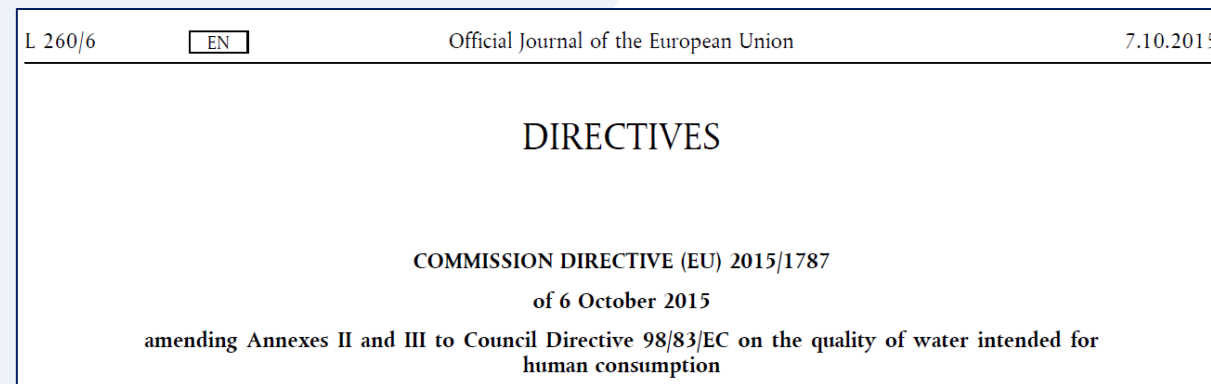


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# WSP: route map towards the Italian implementation



WSP introduced by WHO in 2004 and re-proposed later

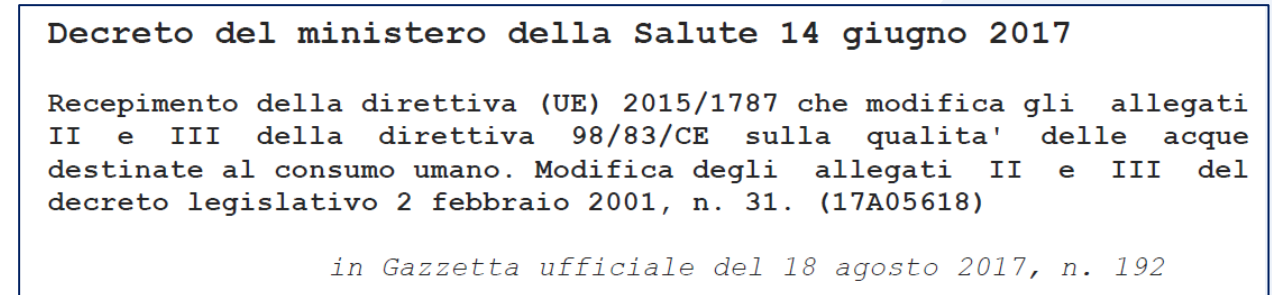


**DIRECTIVE (EU) 2015/1787**  
(amending Annexes II and III of the DWD)

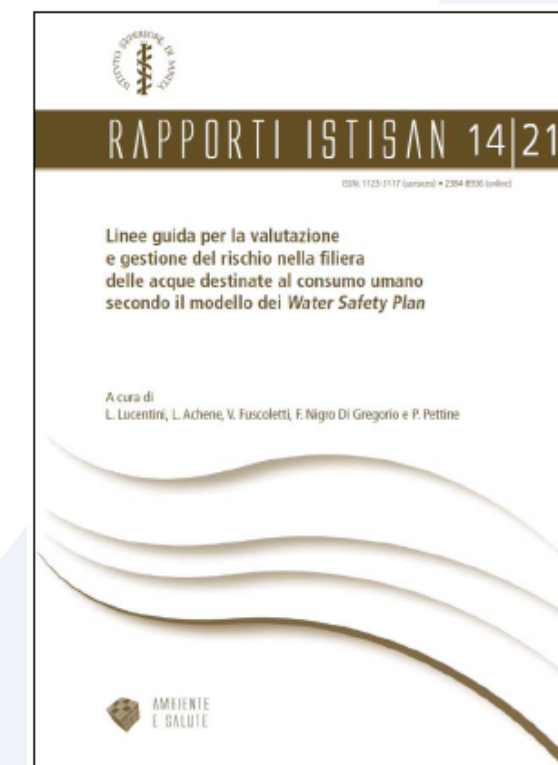
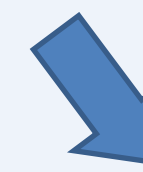


**DIRECTIVE (EU) 2020/2184 (DWD recast)**

Waiting for the transposition into the national legislation



**Transposition into Italian law**  
(amending D.lgs. 31/2001)

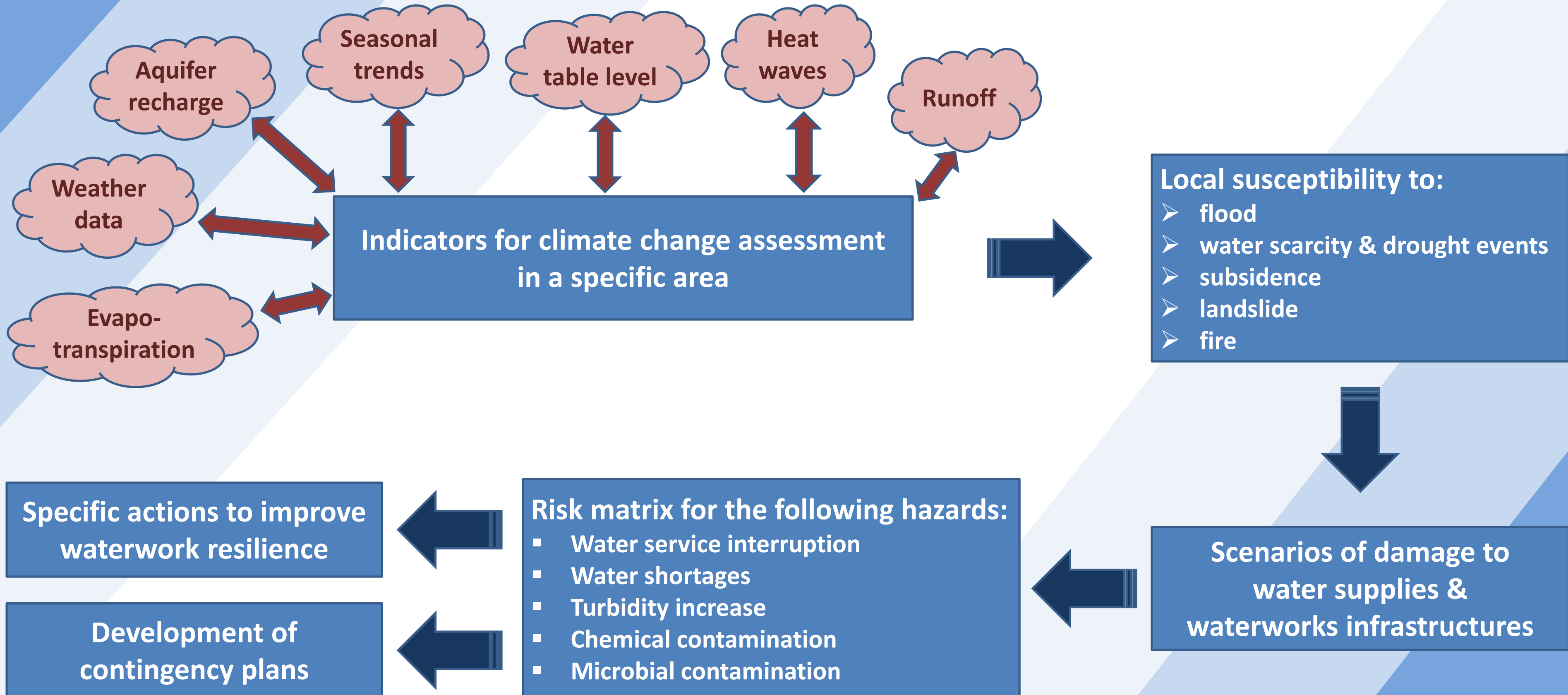


**Italian WSP guidelines**  
(ISTISAN 14/21)



**National training courses**  
for Team leaders & trainers

# Risk analysis and climate change



# How to increase waterworks resilience against climate change

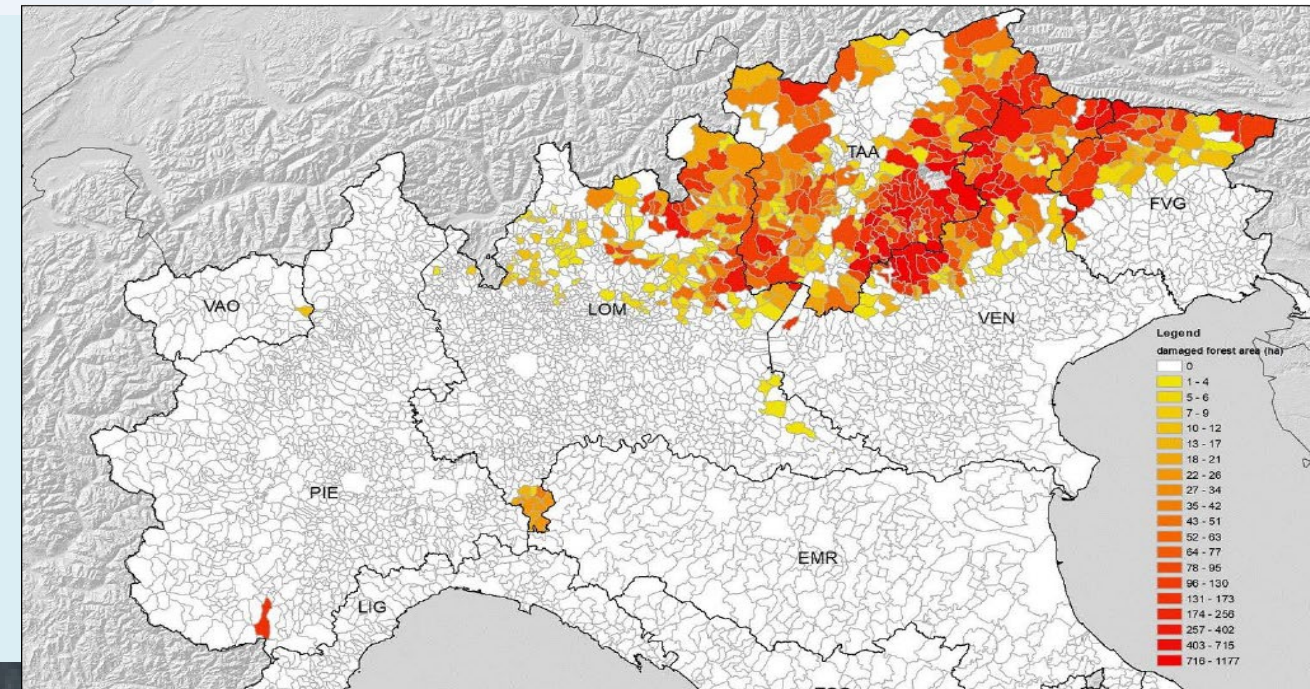
## Frequent actions adopted by Italian water suppliers under WSP:

- Sustainable use of water sources
- WSP & SSP integration: reuse of treated wastewater as an alternative water supply for fountains, irrigation & industrial uses
- Reduction of water losses in distribution networks
- Activation of other water sources
- Alternative water supply (e.g., tank trucks, mobile treatment plants)
- Implementation of storage tanks or reservoirs
- Interconnection with other distribution networks
- Upgrade of river treatment plants using membrane filtration or other innovative processes

# Vaia storm in North-eastern Italy (28-30 Oct 2018)



Vaia affected 5 local administrative authorities:  
the 2 Autonomous Provinces of Trento and Bolzano, the Veneto, Friuli Venezia Giulia, and Lombardy Regions



Forests damage (tens of millions of trees fallen) and reservoirs persistent contamination after an extreme rainfall and flooding with peak winds of 200 Km/h

Up to 720 mm of rain fell to the ground in just 3 days in the mountain areas



# Vaia storm in North-eastern Italy: damages and remedial actions

## Direct and indirect damages to waterworks caused by the storm:

- power failure in all water and sewer systems for 1-3 days
- shutdown of pumping and treatment stations without power generators
- fuel distributors out of service at the same time in the affected area
- interruption of the access routes to most of the plants for the presence of fallen tree logs
- interruption of the water service in some districts for half a day or more
- slight structural damage to few systems
- strong turbidity and presence of putrescible material in water abstracted from high-altitude springs & reservoirs

# Vaia storm in North-eastern Italy: damages and remedial actions

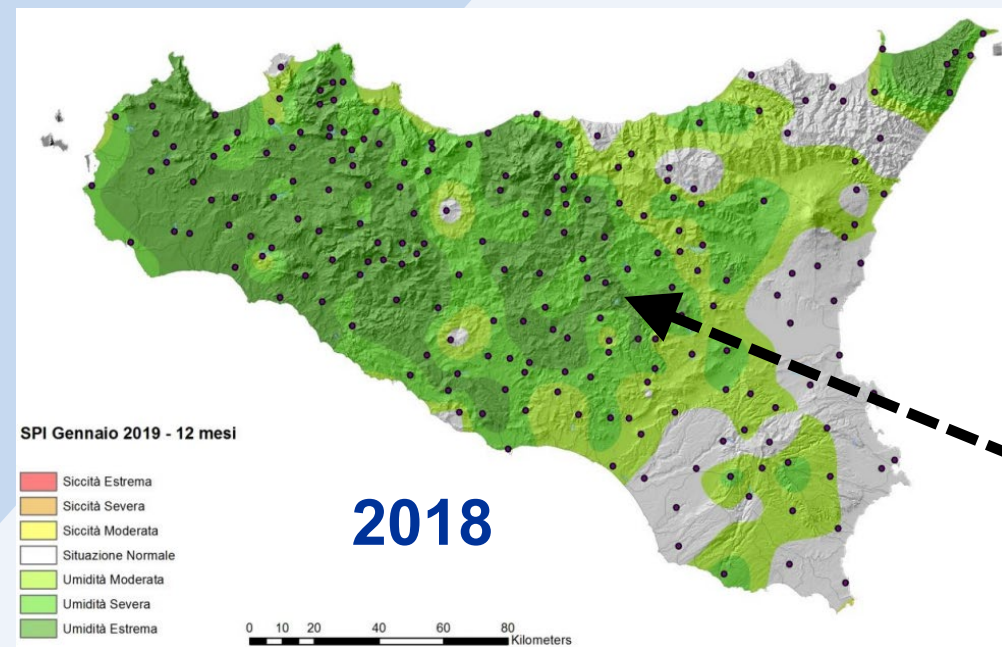
## Remedial actions adopted under the contingency plan:

- rapid set up of power generators and fuel storages where necessary
- hydraulic disconnection of contaminated water supplies
- use of the water accumulated in the tanks immediately after the weather alert
- loading of some water tanks using tank trucks
- activation of pumping from downstream to upstream
- increase in analytical monitoring at water supplies and along the distribution system
- washing of contaminated distribution networks

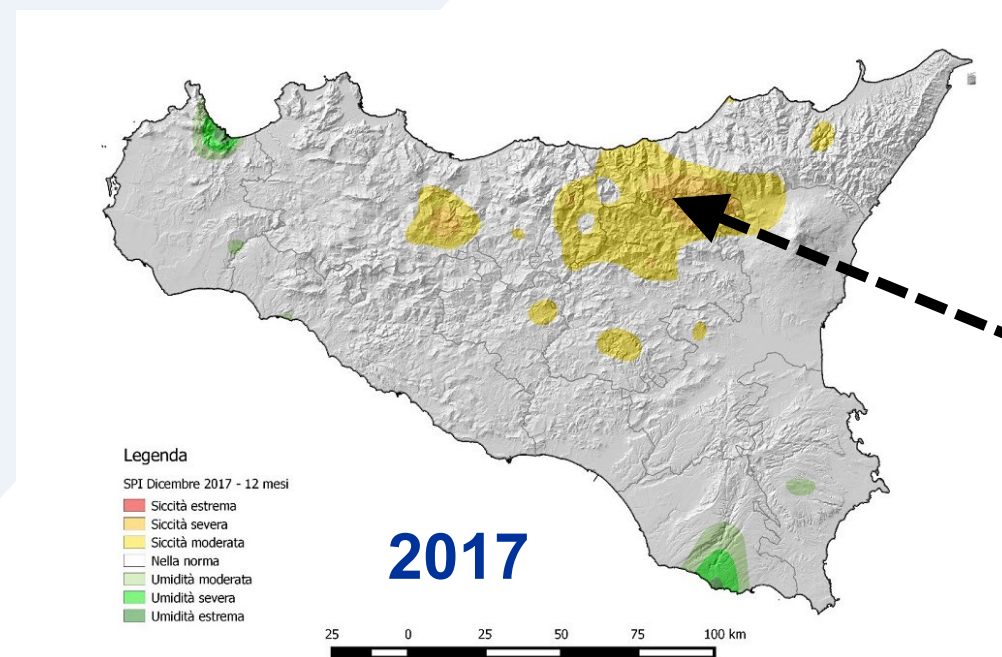
# Rainfall variability in Sicily



## Standardized Precipitation Index

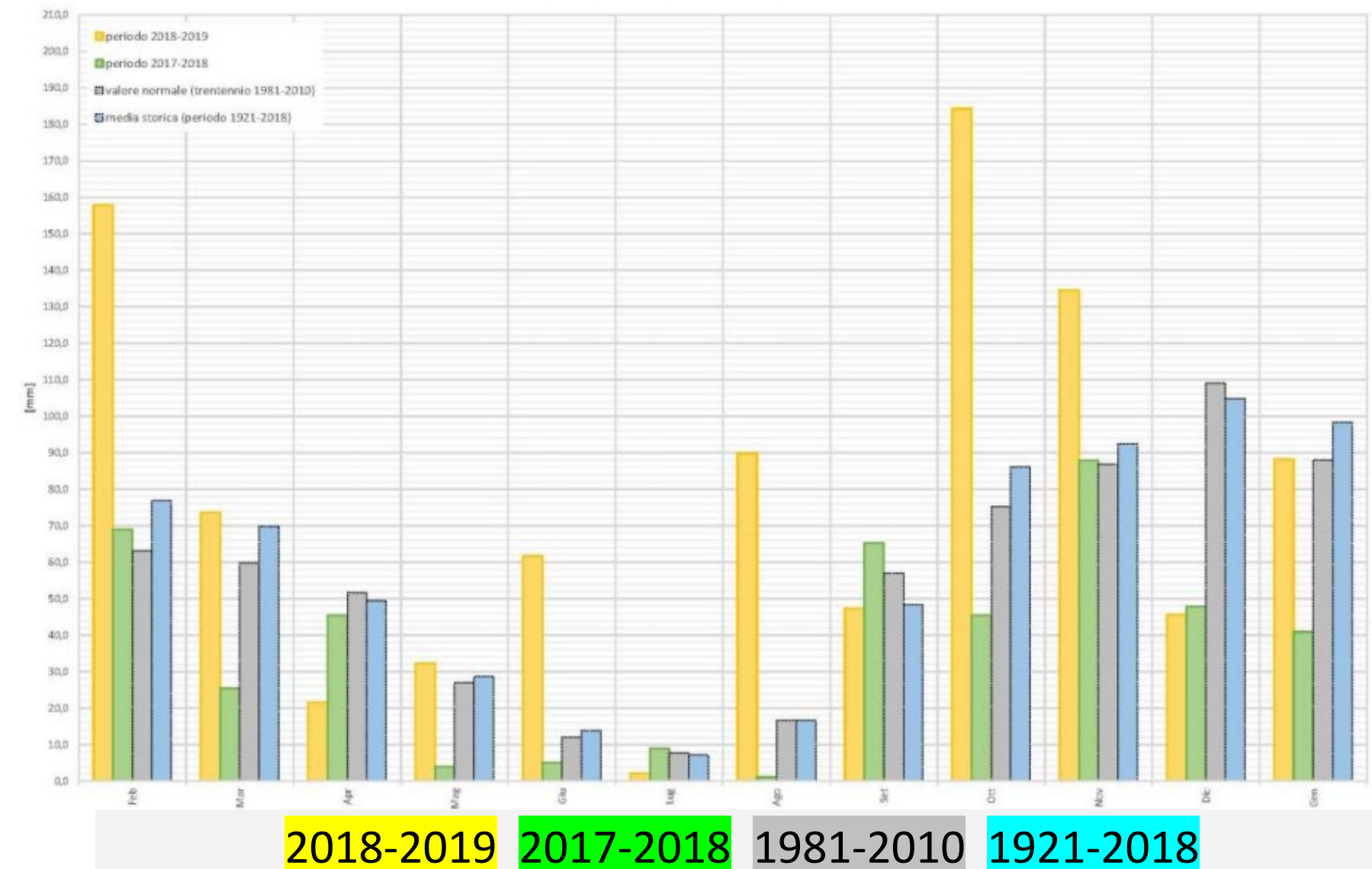


Extreme humidity  
Total rainfall: +36%



Severe drought  
Total rainfall: -18%

## Average monthly rainfall



Reference period: 1921-2018



# Rainfall variability in Sicily: what can a water supplier do?



## Optimized management of the reservoirs

Sustainable use,  
forecasting models



## Strong interconnection of water main pipes

Possibility of feeding the network  
from multiple water sources



## Water reuse

Reuse of treated wastewater  
as an alternative water supply  
for irrigation & industrial uses

Many thanks to the following water companies and institutions for their valuable contribution:



Thank you for your kind attention