

Based on analysis of key informant interviews with irrigation districts managers in 2022

# How do irrigation districts perceive climate change? Key issues for action

## Justification

Extensive research has been carried out to delve into **climate change farmers' perceptions**, but **less attention** was paid to **irrigation districts' experiences**, even their **essential role** to guarantee hydraulic safety, provide water supply for irrigation, and reinforce agricultural production in a changing climate.

### Key takeaways

- ❖ **Irrigation districts are aware of changing climate** and the effects of extreme weather events, significantly increasing temperatures and major frequency and intensity of droughts and floods.
- ❖ They try to **combine hard** (e.g., water infrastructure maintenance, water storage) and **soft** (e.g., climate services, collaboration) **adaptation paths** to contrast the inflow-outflow water imbalance and face climate emergencies.
- ❖ They identify a **neighborhood effect in farmers' behavior**: small farmers tend to follow the same adaptation measures of their neighbors (e.g., water-saving practices and supplementary irrigation).

## What's the issue?

- Climate change is characterized by progressively **rising temperatures**, **erratic precipitation** patterns, and a tendency to increase the frequency and severity of **extreme events**, even in a connected mode.
- The **Lombardy region**, one of the most **productive European agricultural areas**, is **suffering decreasing river flows** in summer and **more intense but less frequent precipitation**, reinforcing **water stress**, even magnified due to the **increasing temperatures**.
- Understanding **heuristics of climate change perceptions** are imperative for **informed decisions** and the first step to **minimizing maladaptation practices**.
- **Irrigation district** is a **public law, self-governing agency**, with **taxing power** that is responsible for the **management and maintenance of rural water infrastructures for irrigation and flood protection** within a specific geographic boundary ('irrigation and reclamation area').
- Examining **irrigation districts' attitudes** is relevant due to:

1) the huge amount of the **licensed water diversions**, 2) **their historical perspective** deriving from the centuries-old extension of their activity, and 3) their capacity to **collect farmers' experiences** regarding extreme events impacts.

### MODFABE project

*The project aims to increase the robustness of decision-making processes by modelling farmers and irrigation districts' perceptions and adaptive capacity to climate change.*

*Data was collected from interviews to 13 irrigation districts and a survey to 460 farmers from the Lombardy region.*

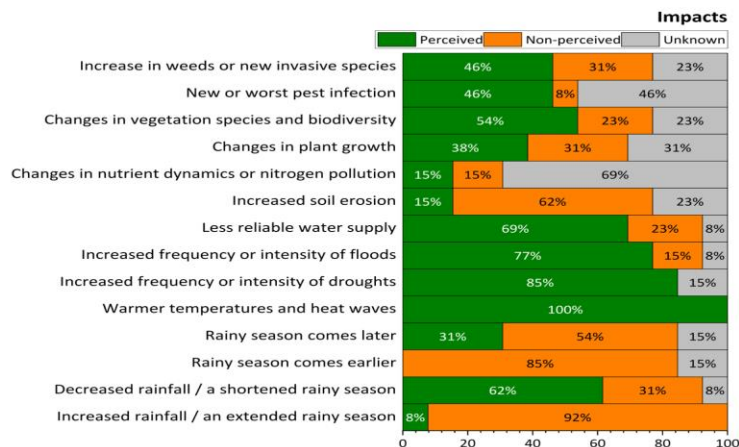
*Modelling human behavior can be used for policy experimentation, testing the effectiveness of strategies and measures to face climate change.*

**“Our main job lies in convincing farmers to get together when facing climate change”** [Media Pianura Bergamasca irrigation district]

## What we know?

### Climate change impacts

- Warmer temperatures, extreme events (heatwaves, droughts, floods) and less reliable water supply are the most perceived impacts of climate change.
- Direct impacts on crops raise more doubts (e.g., changes in nutrient dynamics or new/worst pest infection).



### Adaptation measures

Irrigation districts are acting on **water infrastructure** to manage the inflow-outflow water imbalance, but also applying **water rationing policies** to reduce irrigation time or volume.

Farmers are acting on **crops** (e.g., crop diversification and rotation, inter-cropping, and changes in planting dates), but also introducing **water-saving or less water-intensive crops**.

Some crop changes require **irrigation system conversion** (from surface to drip or sprinkler irrigation), which can put at risk **hydraulic safety and environmental services** if a minimum water flow is not guaranteed through the irrigation canals.

### Adaptation barriers

- Investment cost at the farm level, limited availability of **drought-tolerant crop varieties**, lack of **support and coordination**, and **regulations and rules** that are too complicated.
- Climate science **skepticism and denial** are not perceived.

## Voices

“ An option could be to promote less water-intensive crops, but it is challenging because primary crops (maize, corn, rice) are part of the food culture of the region ”  
[Muzza Bassa Lodigiana]

“ Irrigation districts are like farmers: We look at our neighbors do and exchange learnings with those similar ones ” [Burana]

“ Climate change is seen as an abstract issue, being difficult to perceive impacts at the farming scale, so farmers may be aware of climate change but not excessively worried ” [Irrigazioni Cremonesi]

“ We work in advance on weather forecasts to manage potential extreme events affecting us in 48-72h ”  
[Chiese]

## Balancing dichotomies

- Climate services and farmers' experience
- Water efficiency and supplemental irrigation

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## More information

This brief was prepared by Dr. Sandra Ricart (Politecnico di Milano), with inputs from Engr. Claudio Gandolfi (University of Milan) and Prof. Andrea Castelletti (Politecnico di Milano). The brief is based on findings of the works conducted between 2020 and 2022 and available at the MODFABE website: <https://modfabe.deib.polimi.it/>  
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