A triple-loop survey to delve into physical climate storylines and address climate risk assessment: Learning from farmers' perception and behaviour in northern Italy

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Abstract

Climate change is both a physical and social phenomenon in which individual understandings are contextualized within broader considerations: individuals are not 'blank slates' receiving information about climate change, but that information is always and inevitably filtered through values and worldviews. Personal experience, local knowledge, and social-learning influence climate risk perception and vary substantially among countries and regions. Likewise, they differently affect individuals and social groups at the regional and local scale, among whom exposures, attitudes, and capacities to manage risks vary greatly. A climate storyline approach is hence well-suited to study human observations, compound climate risks, and inform and conceptualize human–water systems interactions. Narrative storylines are used as input drivers to climate models, to represent different development pathways, which are usually characterized and applied at national and sub-national scales. Storylines aim to provide new social scenarios that address local human cognition uncertainties and improve human behavior modelling and robustness when addressing decision-making processes. Climate risks and hazards understanding can be communicated by presenting the experiences or a sequence of events, facts, and observations that are plausible and potentially critical for the system under study. Methods guiding storytelling are usually focused on conducting interviews with stakeholders, carrying out collective workshops, developing appropriate focal questions, and iterating between model results and key stakeholders. Therefore, can other data collection tools be used to reduce uncertainty in physical aspects of climate change from individuals' local experience and perception? This contribution presents a triple-loop survey to detail the core elements of farmers' perception and behavior when addressing climate change risk. We collect first-hand observations from northern Italian farmers about how climate change affects their activity and how extreme events are conditioning their adaptation capacity. Emphasis is placed on understanding the driving factors (risk awareness, perceived impacts, and adaptation measures and barriers) involved in the physically self-consistent past events and the plausibility of those factors. Moreover, we want to test if these factors can provide relevant implications for appropriately modelling storylines in decision-making processes. Tentative results can be useful to discuss the methodological framework of storylines building and narratives modelling, and at which point surveys can be an alternative and complementary way of dealing with deep uncertainty within climate risk management and social scenarios modelling.

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Abstract / Introduction

Personal **experience** and local knowledge **influence** irrigation managers and farmers' **climate risk perception**

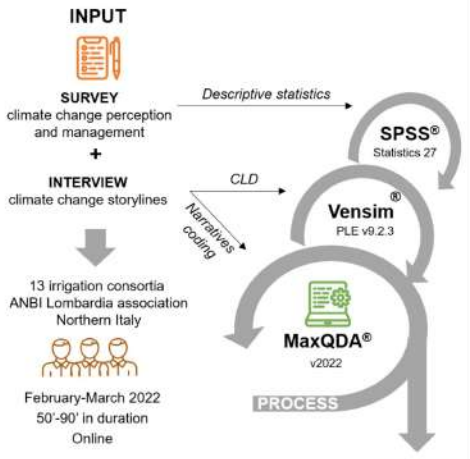
Methods guiding **storytelling** are usually focused on conducting **stakeholders' interviews**, **but**

Can **surveys be used to deepen physical and social aspects** of climate change?

Can interviews and surveys be combined to improve climate change **storylines** and provide new **social scenarios** for **behaviour modelling?**

Methods

A mixed-methodological approach

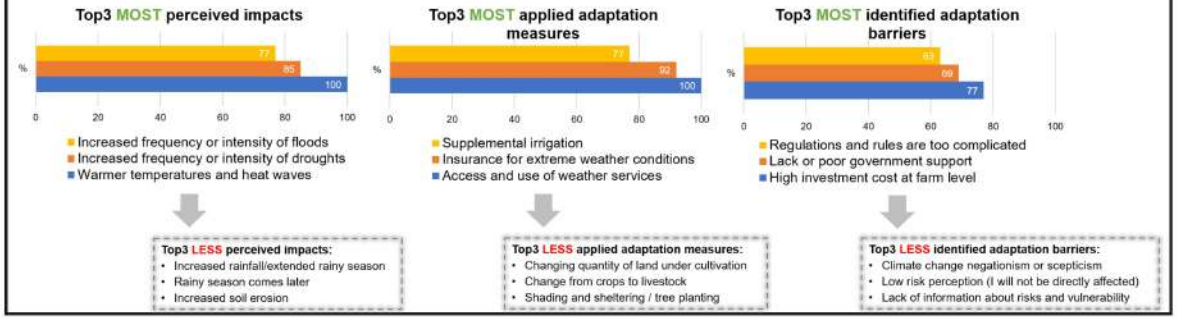


Triple-loop survey:
14 impacts, 20 measures, 9 barriers

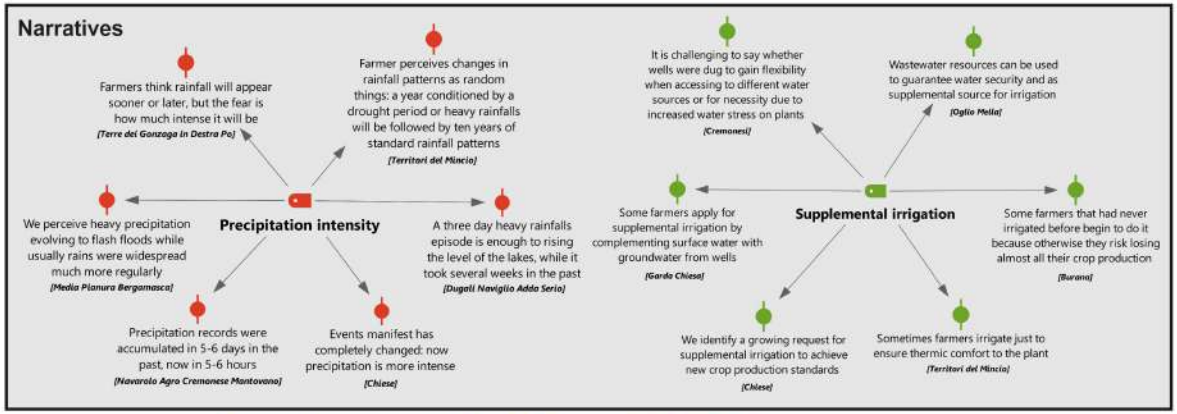
Semi-structured interviews:
concerns, climate change awareness, risk management

Results

Triple-loop survey



Narratives



Causal-loop diagram

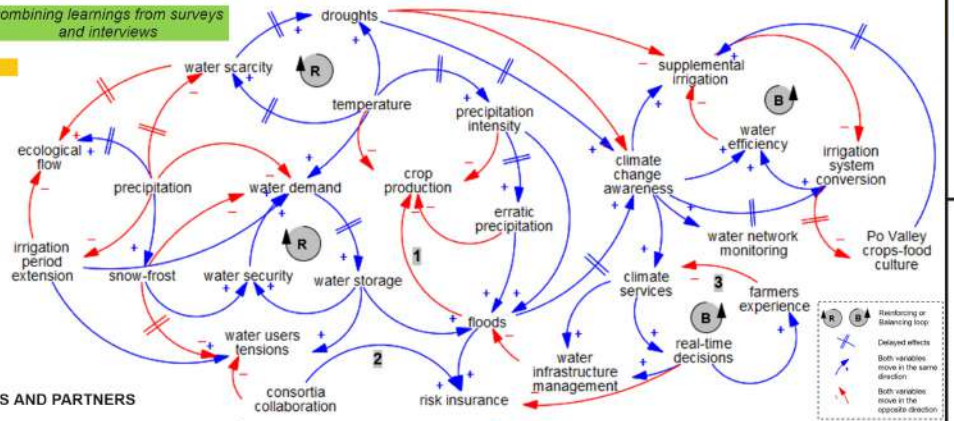
combining learnings from surveys and interviews

Storylines examples

1 *Farmers tend to remind instantaneous river floods due to their physical consequences on water infrastructure and crops production* [Muzza]

2 *Consortia are like farmers: they look at what their neighbours do and exchange learnings with those similar districts* [Burana]

3 *Prediction takes much experience and sometimes luck* [Oglio Mella]



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Conclusion

- **The triple-loop survey** highlighted the most perceived impacts, adaptation measures and barriers in a **structured form**.
- Most of the **impacts, measures and barriers** have been **endorsed** in the **farmers' narratives** from **semi-structured interviews.**
- **The combination of both tools** in a **CLD** provided a **snapshot of main driving-factors** conditioning **farmers' attitudes**.
- **Narratives** and **storylines increase social-learning,** which is fundamental for **behavioural transformation** and **(agent-based) modelling**.

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Keywords

Vulnerability

Adaptation

Methodology