A participatory process for enhanced tailoring of the climate related risks assessment and the identification of context specific adaptation goals and measures

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WHERE

- **Liguria Region (IT – NUTS 2):**
  - Complex morphology, territory squeezed in between the Ligurian Sea, the Alps and the Apennines
  - High population density along the coastline
  - Baseline of high flood and coastal flood risk, also expected high impact generated by climatic changes

WHO

- **CIMA Foundation:** non-profit research organization to promote study, scientific research, technological development and advanced training in engineering and environmental sciences for the protection of public health, civil protection and ecosystems

GOALS

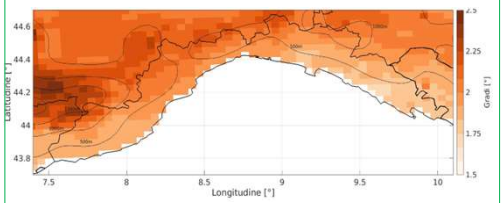
- The Liguria Region required support for the definition of its **Regional Climate Change Adaptation Strategy**
- CIMA supported the Liguria Region and undertook to identify **location specific climate risks and adaptation goals** for the most affected regional sectors

MAIN CHALLENGES

- Climate change affects a plurality of regional sectors (agriculture, tourism, fishery, …)
- Climate change expected local impacts are inevitably uncertain
- Climate risk determinants are inevitably location specific
- Climate change has a complex terminology and an intricate conceptual framework

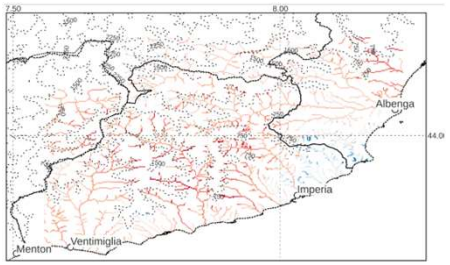
OUR METHOD → Impact chains: A participatory approach to describe the cause-effect relationships between climate change-induced hazards, exposed elements and their vulnerability and resulting risks

Climate drivers: identification of climate drivers thanks to (i) assessment of climate change ongoing tendencies looking at monitored data (support by regional technical agencies), (ii) expected climate scenarios developed through CIMA climate modelling



Expected increase in the annual average temperature (1979/2008 – 2039/2068, RCP 8.5, 4km)

Climate impacts: assessment of climate impact on natural resources through CIMA impact models and expert based evaluation (regional stakeholders)



Expected variation in the annual river discharge (1979/2008 – 2039/2068, RCP 8.5, 170 m)

Sensitivity: identification of susceptibility indicators characterising the exposed elements (e.g: crops with high water requirements)

Exposure: Identification of key exposed assets and/or communities (e.g.: crops and related economic revenues)

Adaptive capacity: identification of determinants on the ability of systems, institutions, human and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences (e.g.: efficient irrigation systems…)

Risk
(e.g.: economic losses due to lower crop yields)

Conclusions

Strengths:

- This participatory approach gives the opportunity to reduce the uncertainty connected to climate impact and risks and to identify location specific determinants of climate risks
- The engagement of local stakeholders allows to boost the local awareness of climate change impact and adaptation solutions
- The participatory assessment of adaptive capacity is effective in identifying specific local adaptation measures, mainstreaming them into local sectorial plans and programs

Weaknesses:

- Our approach was mainly qualitative, thus an aggregated climate risk index was not assessed
- Impact chain methods usually identify a network of interconnected climate impacts, whereas we focused on a more linear representation of climate risk, identifying just a small set of climate impact generated by climate drivers (to simplify interaction with the regional sectors)
- We mainly based our climate forecasts on just one scenario (RCP 8.5), made with just one climate model. The modelling assessment of very site-specific expected climate effects requires high computational and human resources

References:

Zebisch et al (2022). *Climate Impact Chains: A conceptual modelling approach for climate risk assessment in the context of adaptation planning.*

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Luckerath et al (2023). *Using impact chains for assessing local climate risk – A case study on impacts of extended periods of fluvial low waters and drought on a metropolitan region*

Acknowledgements: This work is part of the project "Tools, governance and educational activities to support the development of the Liguria Region Adaptation Strategy", developed in collaboration with UniGe DAD and CenVIS and funded by the Italian Ministry for the Environment (Bando Snsvs 2)