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Supporting the Climate Resilience Transition

Evaluation and Foresight of Inclusive Climate Actions as Nature-based Solutions

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Summary

Cities are increasingly focusing on becoming resilient to climate-driven shocks and stressors. At the same time, they must also confront pressing social issues, such as uneven distribution of socioeconomic vulnerability, unequal access to resources, and underrepresentation of marginalized communities. Normative requirements at different scales pose the attention on the need for just and inclusive resilience strategies. However, planning and academic communities face challenges integrating justice into resilience-planning due to limited frameworks, methods, and tools. This Doctoral Thesis addresses the intersection between justice and resilience by proposing methods and tools supporting cities in the effective integration of Inclusive Climate Actions (ICAs) in the planning process. ICAs are strategies that can enable structural and systemic implementation of adaptation and mitigation measures for equal benefits to communities and ecosystems. This Thesis considers ICAs as strategic measures for the urban climate resilience transition, with specific focus on Nature-based Solutions (NbS) as representative ICAs.

The research is introduced by a systematic review on the possibilities for integration between resilience and justice. This analysis underpins the Thesis, identifying three unexplored objectives to integrate justice within resilience-planning: (1) people-centred approaches, (2) social implications of climate actions, and (3) evaluation across timeframes. The first objective is reflected in the use of inclusive methodologies to ensure the participation of different stakeholders in planning processes. The second objective is used as springboard to the introduction of Systems thinking as comprehensive approach for evaluating resilience-building actions. The third objective is addressed using the foresight approach as pathway for co-creation of future scenarios.

The following research step entails the development of a Monitoring and Evaluation framework for ICAs as NbS. The framework is created by defining a core of generic Key Performance Indicators, and additional sets of place-based supporting indicators. This requires a combination of quantitative and qualitative methodologies, including different participatory activities. Afterwards, the framework is validated through empirical application in the city of Torino, where the effectiveness of four existing projects is evaluated. The process encompasses

the creation of a self-assessment toolkit that details the methodological requirements, the analytical workflow for each indicator, and the evaluation of effectiveness based on the assessment results. This validation offers data-driven evidence of ICA effectiveness, and a standard for replicability of the framework. The final research step is the development of a foresight methodology that supports the co-creation and analysis of future scenarios. This methodology is supported by the creation of a causal network which provides forecasted spatial results on the impacts of proposed ICAs, and it is applied and validated in the city of Torino through co-creation workshops.

In support of the proposed methodologies, two digital interactive decision-support tools are developed. The first has the objective to share information regarding the Monitoring and Evaluation framework and its replicability, and to present the results of its empirical application. The second tool supports the foresight process by operationalizing the causal network and providing real-time forecast analyses of co-created scenarios.

This Doctoral Thesis contributes to the academic and planning discourse by providing innovative conceptual frameworks, methodological approaches, and interactive tools that can be seamlessly integrated with the planning process. With a focus on ICAs as NbS, results support inclusivity in co-creation processes, considering the comprehensive impacts of climate actions and enhancing future-oriented approaches.