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Doctoral Dissertation

Doctoral Program in Urban and Regional Development (33rd Cycle)

Assessing the Resilience of Socio-Ecological Systems to Shape Scenarios of Territorial Transformation

Vanessa Assumma

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Supervisors

Prof. Marta Bottero, Supervisor
Prof. Roberto Monaco, Co-Supervisor
Prof. Elena De Angelis, Co-Supervisor

Doctoral Examination Committee:

Prof. Alessandra Oppio, Referee, Polytechnic University of
Milano
Prof. Maria Groppi, Referee, University of Parma
Prof. Chiara D'Alpaos, University of Padova
Prof. Ivan Blecic, University of Cagliari
Prof. Ricardo Jorge e Silva Bento, University of Trás-os-
Montes and Alto Douro

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Vanessa Assumma
Turin, 6th April 2021

Summary

The environment continues to deteriorate due to the combined effects of anthropogenic activities and the impacts of the ongoing situation of climate-change. Ever more at the centre of the international debate is the need of Decision Makers to put into practice resilience thinking through suitable evaluation models that support the decision-making process in the definition of strategies. The multi-level nature of governance must guarantee the adoption of policies and actions at different spatial scales. The main challenge is to identify sustainable policies that do not compromise the resilience of the environment (Elmqvist et al., 2019). Decision Makers have been encountered some difficulties in adopting resilient actions within local policies. Mismatches have occurred between government actions and environmental outcomes (Pillay & Buschke, 2020). An emblematic case is represented by the wine regions included in the World Heritage List by UNESCO. These regions must periodically satisfy the criteria requirements of the inscription, requiring an effort of the local actors to identify specific interventions aimed at resilience (WHC, 2007). The goal of this thesis is to develop a robust framework for the resilience assessment of Socio-Ecological Systems (SES), with reference to the wine regions, to support the Decision Makers in the planning of scenarios of territorial transformation. This proposal is founded on the integration of three research areas: evaluation of environmental goods, mathematical modeling, and scenario building. The interdisciplinary approach of the proposed framework can analyse the state of art of a SES by managing large amounts of spatial data (Atzori et al. 2010; Kraneburg 2008), predict its potential evolutions if no intervention will be adopted there (Monaco & Soares, 2017) and building scenarios to increase its resilience (Steinitz 2012, Amer et al. 2013). The findings of this thesis provide useful insights to the decision-making process, such as comprehensive interpretation and assessment of complex and fragile SES as the wine regions; methodological support for the definition of shared policies and actions in a long-term perspective, iii) favouring more integration between the procedures of strategic assessment and planning and UNESCO monitoring on the resilience of wine regions. The thesis will be interest of policy makers, planners, freelancers, and stakeholders actively involved in wine regions.

Keywords: resilience; sustainability; socio-ecological system; UNESCO; wine regions; decision-making process; MCDA; GIS methods; mathematical modeling; scenario building.