

# Promotion of Community Resilience through Citizen Science Approaches

## Extended Abstract

In recent decades, the frequency of natural disasters with devastating impacts on local communities has risen globally (CRED, 2022). Consequently, there is an urgent need to prioritize risk reduction and resilience promotion in public policy, particularly in developing countries (Data Pop Alliance, 2015). According to (Colussi, 2000, p. 5), a resilient community is “one that takes intentional action to enhance the personal and collective capacity of its citizens and institutions to respond to, and influence the course of social and economic change”.

However, communities are dynamic entities shaped by both external and internal factors before, during, and after disasters (Barrios, 2014). In this case, Citizen engagement plays a crucial role in fostering resilience within communities. According to Magis (2010), community resilience is related to the capacity of community members to engage community resources to thrive in the face of unpredictable events. This ability depends on community’s empowerment, as an empowered community is better able to anticipate and adapt to stresses and changes and transform itself into more desirable development states (Glass et al., 2022; Skerratt & Steiner, 2013); as well as community’s social capital, which includes social networks, trust, social resources and community cohesion (Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008; Rasmussen, Armstrong, & Chazdon, 2011). Thus, resilient communities are built through active citizenship (Madsen & O’Mullan, 2014), such as volunteering activities.

This paper explores the potential of citizen science (CS) approaches in bolstering community resilience. According to Vadjunec, Colston, Fagin, Boardman, and Birchler (2022), CS has the potential to redefine the role of science in addressing environmental sustainability challenges and enhancing resilience. CS projects often use participatory methods as a means to enroll the general public into the different phases of the research lifecycle along with “professional” scientists (Vadjunec et al., 2022). This approach has the potential to strengthen not only local autonomy and adaptive capacity, but also the adoption of strategies and measures that are suited to local contexts and congruent with local worldviews, beliefs, values, and aspirations, and thus produce more effective and sustained outcomes (Kirkby, Williams, & Huq, 2018).

To address the limited study and scattered literature on the research topic, a systematic review was conducted. Scopus and Web of Science databases were chosen for their extensive bibliographic

datasets and broad journal coverage. Specific search criteria were employed to identify relevant case studies. Inclusion criteria included subject areas, document types, and language, without time constraints. Initially, 377 articles were retrieved from the databases. After applying the inclusion criteria and removing duplicates, this number was narrowed down to 33 articles. From these, a final selection of 12 articles describing case studies from diverse locations including Nepal, Italy, Taiwan, USA, Australia, Brazil, Puerto Rico, Ecuador, and China were thoroughly analyzed.

The results show that CS initiatives are relevant for developing resilience through i) the collection of data from novel sources or remote places where data is scarce, allowing for a better characterization of potential hazards, and the identification of community needs, perceptions and behaviours; ii) enhancing community awareness and knowledge about hazard protection; iii) increase human and social capital through specific training initiatives; and iv) promote the cooperation between community (citizens), academia (professional scientists) and government (policymakers), which is relevant for the development of public policies shaped to local context, and aligned with community's needs and expectations. Finally, the article proposes several contributions to both theory and practice, as it explores the broader effects of CS initiatives on communities, such as the ability to promote change and resilience in order to better face future challenges.

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