



## Identification and evaluation of the components and factors affecting social and economic resilience in city of Rudbar, Iran



Amir Bastaminia<sup>a</sup>, Mohammad Reza Rezaei<sup>a</sup>, Maryam Dastoorpoor<sup>b,\*</sup>

<sup>a</sup> Department of Geography, School of Humanities, Yazd University, Yazd, Iran

<sup>b</sup> Department of Epidemiology and Biostatistics, Faculty of Public Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

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### ABSTRACT

The current study aims at identifying and measuring components and factors affecting social and economic resilience in Rudbar, Iran. This applied research is using descriptive and analytical methods. The sample size in the study was estimated as 345 households using the Cochran's formula. Using library resources and experts, the components and factors affecting social and economic resilience were identified. Afterwards, the required data and information were collected using field method and household questionnaire. To analyze the data, descriptive and analytical statistical methods, including one-sample *t*-test, univariate and multiple linear regressions, were used. Awareness, knowledge, skill, attitude and social capital indices were considered as components of social resilience and the amount and severity of damage, compensation, and the possibility of returning to occupational and financial conditions were considered as the economic resilience components. Results of descriptive statistics showed that, in terms of social resilience ( $216.3 \pm 33.4$ ) and economic resilience ( $30.6 \pm 7.3$ ) (Mean  $\pm$  SD), households in Rudbar were in a relatively appropriate and inappropriate conditions, respectively. With respect to the factors affecting social and economic resilience, the results of multiple linear regression model showed that social resilience increases with the length of stay in neighborhood, the number of educated family members, higher education level of the head of the household, the employed heads of household compared to unemployed ones, having physically-mentally disabled persons in the family, owning the house compared to renting it. Moreover, it seems that economic resilience might increase with having employed family members (other than the head of the household), medical and accident insurance, higher approximate value of dwelling, and lower monthly expenses. Based on the findings, the study proposes some social and economic resilience components which could be used to improve the flexibility and resilience level of the communities at neighborhood level.

### 1. Introduction

Natural disasters such as floods, earthquakes and hurricanes often have devastating effects on human settlements and have left heavy casualties for the inhabitants. Disasters ruin buildings and infrastructures in disaster prone areas and impose numerous economic and social mal-effects on communities all over the world [1–4]. During the recent years, the world has witnessed some unforeseen natural disasters (Rudbar earthquake in 1990; Bam earthquake in 2003; the Indian Ocean Tsunami in 2004; and Haiti earthquake, 2009, etc.). While a few measures are used to predict hazards, one cannot foresee future hazards based on evidences. Moreover, the intensity, size and location of hazards are hard to predict. Therefore, it is crucially important to increase or improve the capacity of a system to withstand and renovate it-self after disasters [5]. Therefore, the global attitude toward hazards has changed fundamentally to the extent that the prominent global

attitude is changed from reducing the damage to increasing resilience to disasters [6–9]. Given this prevailing attitude, risk reduction programs should seek to build and strengthen the characteristics of resilient communities and pay attention to the concept of resilience in disaster management chains [10].

Promoting the concept as an approach needs to be considered in the steps of disaster management. Since the adoption of Hyogo Framework for Action in United Nations International Strategy for Disaster Reduction (UNISDR), the planning process for reducing the disaster risks, in line with damage reduction, focused significantly on improving resilience in societies [11]. The plans were followed by creating resilient communities through promoting integration in attitudes toward vulnerability reduction, increasing local capacities to build resilience and integrating risk reduction through designing and implementing emergency plans, response, rehabilitation and reconstruction programs [12,13].

\* Corresponding author.

E-mail addresses: [Abastami31@gmail.com](mailto:Abastami31@gmail.com) (A. Bastaminia), [Rezaei58@gmail.com](mailto:Rezaei58@gmail.com) (M.R. Rezaei), [mdastoorpour@yahoo.com](mailto:mdastoorpour@yahoo.com) (M. Dastoorpoor).

In fact, in resilience approaches, the purpose is to reduce the vulnerability of communities to hazards and strengthen them to withstand the risks resulting from natural disasters [10,13–17]. This view rejects the previous perspectives in social, economic, political, physical and environmental contexts which took natural disasters as inevitable incidents and believed in managing disasters to alleviate their negative effects. In other words, as the result of not predicting the damage to social systems and lack of complete assessment of the hazards, resilience can be defined as the amount of adaptation capability of a systems to change, without collapsing during a disaster [18–21]. Given the fact that a society's responses to hazards are dynamic, resilience is a kind of prospectiveness which could help policy-makers face uncertainty and change [22]. Therefore, promoting resilience to disasters could lead into an increase in adaptation capacity and sustainable life in communities [13,14,23–25]. Given the above, we can argue that resilience deals with issues related to communities, systems supporting them, and different functions of the communities in physical, economic and natural contexts. The term as a framework might be related to every procedure and component in crisis management [26–30].

Currently, many governmental and non-governmental organizations are giving priority to strengthening the resilience of groups and communities through conducting research, developing plans and policies, and carrying out training initiatives in the field of disaster management [31]. These include: Emergency Management Australia [32]; creating personal and social resilience, Inter-American Development Bank [33]; measuring the fragility of social and economic resilience, UN Dry lands Development Centre [34]; developing a framework for measuring global resilience and specific fields for resilience, Faculty of Environment, Western Washington University [35]; developing a simulated model for improving social resilience in the United States, United Nations University [36]; disaster risk for 173 countries worldwide focusing upon being exposed to risk, sensitivity, the capacity to deal and cope with risks, UN Office for Disaster Risk Reduction [37]; disaster risk reduction through the promotion of social and economic resilience, and The World Economic Forum [38]; the study of resilience among countries for coping with global hazards.

The above-mentioned initiatives prove the importance of resilience, particularly its social and economic aspects in reducing natural disasters. Despite the focus upon the issue and using the term resilience in different fields, there is a gap in the theoretical and practical understanding, evaluation, measurement and development of the concept [39–41]. In this regard, the main challenge is to define the components and develop measurement indexes, how to plan and at what level (household, neighborhood, national, and/or global) [10,42–44]. Therefore, developing a theoretical framework to define and measure the components and indexes of resilience seems inevitable. To develop and strengthen resilience in a community, we need to answer these key questions: Which components and indexes are required to evaluate and measure resilience? What is the status of resilience in communities hit by natural disasters? What is the role of contextual factors in promoting resilience level in communities hit by disasters?

Focusing on Rudbar (as a city with the history of severe earthquake (1990), the present study aims at answering the above questions. The purpose of the study is to identify and evaluate the components of social and economic resilience (as dimensions mostly relate to citizens) and contextual factors affecting the two dimensions.

## 2. Theoretical background

### 2.1. Resilience

The concept of resilience in the field of natural hazards studies was first used by Timmerman in 1981 [14,45,46]. The concept was originally used to describe the resistance of natural systems to disorders and their capability to renovate and organize themselves [47–52]. The

concept was born out of the primary focus on overall strength and constant change of the functions of the world's ecological systems, orientation toward social-ecological systems, adaptability of human beings to nature and gradual social evolution in the face of global changes [53]. The primary subject matter in resilience literature is people and communities, the major aspect of which is adaptation to change. Focus on learning, self-organization and flexibility are the vital parts of leading complex feedbacks, thresholds and system changes [15,52,54–57].

A look at the theoretical evolution of resilience shows that a concept once used with a unique direct meaning, is now a complicated multi-purpose entity with complex and different relationships. Therefore, resilience is now used with more diversity in different sciences related to human-nature interactions such as vulnerability and hazards reduction [58–60]. That is why it is studied by a vast body of experts like ecologists [61,62], psychologists [13,63], geographers [64–66], general health experts [67,68], engineers [69,70], local governments [71], and global process managers [72]. This has provided resilience with numerous definitions and theoretical models which are built upon strong experimental evidences [10,41,73]. This, in turn, has resulted to ambiguity in the meaning and approaches toward resilience and different epistemological, methodological and conceptual orientations [16]. According to McEntire et al. [74], another challenge to achieve one definition accepted by the scientific community is the fact that individuals, groups and communities each might have various levels of resilience which could be defined differently. Eser [75], argues that ambiguity and flexibility of resilience as a concept is valuable because it can create a closer relationship between the fields and practical sciences.

Review of the literature about resilience reveals that some scholars have adopted the ecological view toward resilience and have focused upon the self-organization capabilities of a system. They define the concept of resilience to disasters as a process rather than a consequence or an output [49,59,76–80]. Other scholars focus upon a long-term perspective and define resilience to disasters as a long-term post-disaster recovery process. That is, resilience could be used as a scale or measure to recover and redress the damage [81–85]. Some researchers have referred to the concept of adaptability, because it increases the learning capability and coping with disasters [13,86–90]. According to Gallopin [91] and Vogel [92], resilience, adaptability and vulnerability are key words which share some methods. Some other scholars believe resilience to disaster is related to sustainability [7,93–97]. Because, according to this group of researchers, sustainability is long-term survival, without a deterioration in quality of life. Review of the literature related to resilience shows that resilience and sustainability are not exactly the same. However, the two concepts have a close relationship. Sustainable societies, if resilient, can remain stable. While resilience focuses on short-term and long-term adaptability, sustainable development is meant for long-term periods for future generations. However, we need to note that improving resilience and sustainable development might backfire if their results are not managed as complements [98]. Some literature on resilience to disaster consider the term contrary to vulnerability. However, in line with the variables of sensitivity, they consider resilience as one of the three factors determining vulnerability. In other words, promoting resilience leads to vulnerability reduction [25,91,99–102]. In sum, vulnerability as an approach has led into the evolution of resilience through focusing more on human systems, their social consequences and the role played by political decisions.

Drawing upon the literature, this study defines resilience of a community to disasters as: “The amount of disturbance a system can absorb and still stay in the same condition; a system's ability to self-organize (versus lack of organization or organization under external forces); and a system's ability to create and promote its learning and adaptability capacities”.

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