

**The Role Earthquake Risk Management in Reducing the Vulnerability of Rural Areas, emphasizing on the Residents' Perspectives (Case Study: Izadkhast District, Zarrindasht)**

**Asieh Hassaninejad**

*PhD Candidate in Geography and Rural Planning, Faculty of Geographical Sciences and Planning, University of Isfahan, Isfahan, Iran*

**Ahmad Taghdisi<sup>1</sup>**

*Associate Professor in Geography and Rural Planning, Faculty of Geographical Sciences and Planning, University of Isfahan, Isfahan, Iran*

**Seyyed Hedayatollah Nouri**

*Professor in Geography and Rural Planning, Faculty of Geographical Sciences and Planning, University of Isfahan, Isfahan, Iran*

**Saeedreza Akbarian Ronizi**

*Associate Professor the Department of Geography, Faculty of Economics, Management and Social Sciences, Shiraz University, Shiraz, Iran*

*Received: 3 December 2017*

*Accepted: 19 May 2018*

**Extended Abstract**

**1. Introduction**

Earthquakes are natural disasters that take place during a short time and may bring about considerable damage. In Iran, rural areas are significantly subject to damages caused by earthquakes. Due to their close connections to the natural environment and limited capacity against environmental threats, rural communities are more vulnerable to environmental risks such as earthquakes. Subsequently, during the past few decades, special attention has been paid to the identification and presentation of essential strategies to confront the earthquake phenomenon in different scales, at both global and domestic levels, in the form of new management methods such as risk management. Izadkhast region of Zarrindasht town is located in Chah Reza Fault, in the middle of the high seismic area of Zagros; therefore, the region is significantly subject to earthquakes. The occurrence of this natural disasters have brought about considerable damages to human settlements in this region, particularly in rural areas, times and times again. As a result, the present study seeks to examine the views of local settlers and investigate the vulnerability status of rural communities to earthquake risks; to this end, it is attempted to provide answers to this question: Have risk management indices been effective on reducing the vulnerability of rural settlements?

**2. Theoretical Framework**

In the recent years, there has been a paradigm shift in the majority of studies on disasters and risks from “reducing damages and casualties” to a more comprehensive model

---

1. Corresponding author. E-mail: a.taghdisi@geo.ui.ac.ir

involving risk management based upon social systems and social problem-solving approaches. It should be noted that the science of risk management has offered numerous potential and practical capabilities in this regard; consequently, it is considered as a necessity with regards to the subject at hand. In a study conducted as a comprehensive plan for earthquake risk management in Mumbai, Sinha, Goyal, Shinde and Meena (2012) assessed the risks and the reduction of damages. Their results showed the significant effect of construction type and economic characteristics on reducing the vulnerability of the region.

Wen-co and Ling (2013) evaluated the earthquake risks and efficient management strategies of earthquake risks for the Heitech Region in Taiwan. According to the results, an efficient risk management strategy should be designed in order to calculate the total costs of annual earthquake risks. At the same time, Dixit, Yatabe, Dahal and Bhandary (2013) examined the initiatives for earthquake risk management at Kathmandu Valley and showed that the major factors that contribute to the vulnerability of the region to earthquakes include lack of trained personnel, building inspectors, engineers and architects to ensure earthquake safety improvement.

In Iran, Roumiani, Einali and Salehi Mishani (2015) investigated the role of management in the development of rural communities in confronting earthquake risks in Zagheh Village, Khoramabad Town. Based on their results and the views of rural authorities, the presence of weaknesses in economic capacities and strengths and hence, the low income of rural residents at the region have reduced their ability in strengthening the houses located at their settlements.

### **3. Method**

The present applied study was conducted using the descriptive-analytical method. In order to obtain the people's opinions to assess risk management at earthquake-stricken areas, document and field studies were carried out using instruments including questionnaires and interviews. The total population of the study included 2,381 rural households living in Izadkhash region and seven villages located at the vicinity of fault including Mazaijan, Darreh Shour, Golkouyeh, Dehno, Chah Zebar, Bon Dasht, and Panj Chah. The sample population was calculated as 350 households using Cochran's formula. Data were analyzed via descriptive and inferential methods such as one-sample t test, Freidman, and multi-variable regression.

### **4. Results and Discussion**

According to the results obtained from the examination of the vulnerability status of rural communities to earthquake risks and Friedman test, the calculated mean value was below average and the significance level was below 0.05. Therefore, the vulnerability of the sample community to earthquakes is confirmed as significant. The results obtained from the examination of the most important factors of rural settlements' vulnerability to earthquakes according to Friedman test suggested a significant difference among the mean values of economic, social, institutional, and physical-environmental vulnerability variables at 0.01 alpha level. Meanwhile, the highest and lowest rating averages belonged to physical-environmental and institutional variables, respectively. The regression method was used to examine

the effect of risk management indices on reducing vulnerability. The results demonstrated that the variable of buildings' resistance against earthquakes had the highest effect on reducing vulnerability of the studied region.

## 5. Conclusion

The present study was conducted with the purpose of examining the role of earthquake risk management in reducing the vulnerability of rural communities in Zarin Dasht Town. The findings of the study showed that the extent of vulnerability to earthquakes is below average at all dimensions including economic, social, institutional, and physical-environmental. The following recommendations are listed below based on the obtained results in line with reducing the damages caused by earthquake risk within the framework of risk management indices:

1. Empowerment of local people and authorities in various affairs prior to earthquakes;
2. Reinforcement of vulnerable buildings using the capabilities of local authorities;
3. Improving awareness, particularly awareness of the time of earthquake occurrence using local and modern scientific capacities.

**Keywords:** Vulnerability, Earthquake, Risk Management, Izadkhist

## References (In Persian)

1. Aghayari Hir, M., & Zakeri Miab, K. (2016). ارزیابی ریسک زلزله مبتنی بر مخاطره و آسیب پذیری در نواحی روستایی مطالعه موردی: بخش مرکزی شهرستان مرند [The assessment of earthquake risk based on hazard and vulnerability in rural areas case study: Central district of marand county]. *Journal of Geography and Planning*, 20(57), 1-21.
2. Einali, J., Farahani, H., & Jafari, N. (2014). [Evaluation of the role of social capital in reduction of earthquake disaster consequences in Sojasrood county Khodabande township]. *Journal of Geographical Sciences*, 14(32), 93-115.
3. Farahani, H., & Asheri, R. (2013). نقش مدیریت روستایی در توسعه جوامع روستایی جهت مقابله با مخاطرات طبیعی (مطالعه موردی: دهستان گوزلدرد- شهرستان ابهر) [The role of rural management in rural areas for conterfiting natural hazards (Case study: Gozaldareh - Abhar)]. Paper presented at *The First National Conference on Strategies for Attaining Sustainable Development in Agriculture, Natural Resources and Environment Sectors*. Mehr Arvand University, Abadan, Iran.
4. Iranian Seismological Center. (2011). مرکز لرزه‌نگاری مؤسسه ژئوفیزیک دانشگاه تهران. گزارش مقدماتی رویداد زمین‌لرزه شهرستان زرین‌دشت استان فارس. بازیابی از زرین دشت استان فارس [Introductory report on earthquake of Zarrindasht, Fars]. Retrieved from <https://b2n.ir/363528>
5. Pourtaheri, M., Parishan, M., Roknoddin Eftekhari, A., Asgari, A. (2011). سنجش و ارزیابی مولفه‌های مبنایی مدیریت ریسک زلزله [Analysis and evaluation of the most important factors of risk management (Case study: Rural areas of Ghazvin Province)]. *Journal of Rural Researches*, 2(1), 115-150.

6. Roumiani, A., Einali, J., & Salehi Mishani, H. (2015). نقش مدیریت در توسعه ی جوامع (روستایی برای مقابله با مخاطرات زلزله؛ (مطالعه ی موردی: دهستان زاغه ی شهرستان خرم آباد [The role of management in rural development to cope with earthquake hazards (Case study: Zaghe Dehestan in Khoramabad County)]. *Journal of Research and Rural Planning*, 3(8), 93-106.
7. Yari, A., & Parishan, M. (2017). بررسی نقش آموزش در مدیریت ریسک مخاطرات طبیعی (زلزله) مورد: مناطق روستایی شهرستان قزوین [Exploring the role of education in risk management of natural hazards (earthquake); Case study: Rural areas of Ghazvin city]. *Journal of Natural Hazards*, 4(1), 49-62.
8. Zarrindasht Islamic Revolution Housing Foundation. (2007). گزارش کامل از وضعیت تخریب مسکن روستایی در اثر زلزله [A complete report on rural buildings destroyed by earthquakes]. Zarrindasht, Iran.

#### References (In English)

1. Bhandari, R. B., Okada, N., Yokomatsu, M., & Ikee, H. (2010). Building a disaster resilient community through ritual based social capital: A brief analysis of findings from the case study of Kishiwada. *Annuals of Disas. Prev. Res. Inst., Kyoto Univ.*, No. 53B. Retrieved from <https://b2n.ir/624344>
2. Department of Disaster (USA). (1999). *Planning progress for community risk management*. New Jersey, NJ: Prentice Hall.
3. Dixit, A. M., Yatabe, R., Dahal, R. K., & Bhandary, N. P. (2013). Initiatives for earthquake disaster risk management in the Kathmandu Valley. *Natural hazards*, 69(1), 631-654.
4. Dyke, G., Gill, S., & Davies, R. (2011). Applications of earth observations to disaster risk management. *Acta Astronautica*, 68(1), 301-315.
5. Faizian, M., Schalcher, H. R., & Faber, M. H. (2005, June). Consequence assessment in earthquake risk management using damage indicators. In *9th International Conference on Structural Safety and Reliability (ICOSSAR 05)*, (pp. 19-23). Rome, Italy.
6. Hsu, W. K., Chiang, W. L., & Chen, C. W. (2013). Earthquake risk assessment and optimal risk management strategies for hi-tech fabs in Taiwan. *Natural hazards*, 65(3), 2063-2076.
7. Lutman, M. (2014, September 8-10). Aspects of earthquake risk management in Slovenia. Paper presented at the *4th International Conference on Building Resilience, Building Resilience*. Salford Quays, Britain.
8. Parker, G. (1995). Dimensions of risk management: Definition and implications for financial services. In W. H. Beaver, & G. Parker (Eds.), *Risk management: Problems and solutions* (pp. 1-16). New York, NY: McGraw-Hill.
9. Sinha, R., Goyal, A., Shinde, R. M., & Meena, M. (2012). An earthquake risk management master plan for Mumbai: Risk assessment and its mitigation. In *Proceedings of 15WCEE: World Conference on Earthquake Engineering, Lisbon. Portugal*.

10. Taubenböck, H., Roth, A., & Dech, S. (2007). Vulnerability assessment using remote sensing: The earthquake prone megacity Istanbul, Turkey. *Proceedings of ISRSE 2007*, 1-5. San Jose, Costa Rica.
11. UN/ISDR. (2004). *United Nations inter-agency secretariat of the international strategy for disaster reduction*. Retrieved from <https://b2n.ir/116952>
12. United Nations Economic and Social Commission for Asia and the Pacific. (2010). *Protecting development gains: Reducing disaster vulnerability and building resilience in Asia and the Pacific*. Retrieved from <https://b2n.ir/912633>
13. Yodmani, S. (2001). *Disaster risk management and vulnerability reduction: Protecting the poor*. Paper Presented at the Asia and Pacific Forum on Poverty. Asian Development Bank, Philippines.

**How to cite this article:**

Hassaninejad, A., Taghdisi, A., Nouri, H., & Akbarian Ronizi, S. R. (2020). The role earthquake risk management in reducing the vulnerability of rural areas, emphasizing on the residents' perspectives (Case study: Izadkhasht district, Zarrindasht). *Journal of Geography and Regional Development*, 17(2), 45-65.

URL <http://jgrd.um.ac.ir/index.php/geography/article/view/69152>