

Letter to Editor

Assessing the Comprehensiveness of the THIRA Tool



Hamidreza Khankeh^{1,2} , Javad Shojafard¹ , Mohammad Saatchi^{1,3} , Mobin Ebrahimiyan¹

1. Health in Emergency and Disaster Research Center, Social Health Research Institute, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran.

2. QUEST Center for Responsible Research, Berlin Institute of Health at Charité, Berlin, Germany.



Citation Khankeh H, Shojafard J, Saatchi M, Ebrahimiyan M. Assessing the Comprehensiveness of the THIRA Tool. *Health in Emergencies and Disasters Quarterly*. 2026; 11(2):91-92. <http://dx.doi.org/10.32598/hdq.11.2.521.1>

<http://dx.doi.org/10.32598/hdq.11.2.521.1>

Dear Editor

Risk assessment is recognized as the foundational strategy for reducing and managing disaster risk arising from both natural and man-made hazards. It plays a crucial role in shaping disaster risk management policies by enabling stakeholders, including governments, emergency organizations, and the public, to make informed decisions across all phases of disaster risk management, including risk reduction, preparedness, response, and recovery [1-5].

Comprehensive risk assessment requires an in-depth understanding of vulnerability, exposure, capacity, and the nature of hazards, particularly in complex and multi-hazard environments [1-4, 6]. To support this, a variety of assessment tools have been developed, such as the failure modes and effects analysis (FMEA), the hazard and operability study (HAZOP), the strategic toolkit for assessing risks (STAR), and threat and hazard identification and risk assessment (THIRA) [7-9]. Among them, the THIRA tool, developed by FEMA, stands out as a key and practical tool, specifically tailored for disaster risk management in the U.S. context [9].

THIRA is a scenario-based, three-step process that helps communities identify hazards and threats, contextualize them, and determine required capabilities to

manage them. This is aligned with core capabilities in the form of five mission areas: Prevention, protection, mitigation, response, and recovery [9-11]. Although this tool has contributed significantly to enhancing preparedness planning and capacity building, it is not without limitations.

Primarily, THIRA operates on a single-hazard approach and lacks a robust framework for addressing multi-hazard interactions, such as cascading, compound, or triggering effects, which are very complicated to manage [6, 12]. It also does not explicitly incorporate probability analysis, a core component of risk quantification, nor does it sufficiently address vulnerability, especially across its social, cultural, environmental, and organizational dimensions [1, 13-15].

Another limitation is its dependence on standardized capabilities in the USA that may not align with the preparedness levels of other countries, limiting its global applicability. Furthermore, while THIRA emphasizes primarily preparedness and response, its utility in the prevention phase remains limited.

To enhance the effectiveness and applicability of THIRA, we propose the following:

1. Integrate a multi-hazard approach by accounting for interactions between hazards.

* Corresponding Author:

Mobin Ebrahimiyan

Address: Health in Emergency and Disaster Research Center, Social Health Research Institute, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran. **E-mail:** mobin4.ebrahimiyan@gmail.com



Copyright © 2026 The Author(s);
This is an open access article distributed under the terms of the Creative Commons Attribution License (CC-BY-NC: <https://creativecommons.org/licenses/by-nc/4.0/legalcode.en>), which permits use, distribution, and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

2. Include risk-based indicators, such as probability and vulnerability, in the risk assessment process.
3. Broaden the scope to encompass all hazards, including both natural and man-made events.
4. Reduce dependency on extensive data from multiple entities, making the tool more adaptable in data-scarce environments in low- and middle-income countries.
5. Develop mechanisms for quantifying the cascading impacts of disasters resulting from hazardous events.

These recommendations align with priorities outlined in the Sendai framework, the Hyogo framework, and the global risk report 2024 [2, 16, 17], which stress the importance of holistic, multi-hazard risk assessment to gain better understanding of disaster risk.

We advocate for further empirical studies and pilot implementation to evaluate THIRA's comprehensiveness and to inform future improvements in the field of disaster risk management.

References

- [1] Ramli MWA, Alias NE, Yusof HM, Yusop Z, Taib SM. Development of a local, integrated disaster risk assessment framework for Malaysia. *Sustainability*. 2021; 13(19):10792. [DOI:10.3390/su131910792]
- [2] United Nations. Sendai framework for disaster risk reduction 2015-2030. New York: United Nations; 2015. [Link]
- [3] UNDRR. The disaster risk reduction (DRR) glossary [Internet]. 2017 [Updated 2017 February 2]. Available from: [Link]
- [4] Rovins JE, Wilson TM, Hayes J, Jensen S, Dohaney J, Mitchell J, et al. Risk assessment handbook. Turitea: Massey University; 2015. [Link]
- [5] Khankeh H, Akbari Shahrestanaki Y, Bahrampouri S, Beyramijam M. National health-oriented hazard assessment in Iran based on the first priority for action in Sendai framework for disaster risk reduction 2015-2030. *Emergency Medicine International*. 2021; 2021:5593223. [DOI:10.1155/2021/5593223] [PMID]
- [6] Kappes MS. Multi-hazard risk analyses: A concept and its implementation [PhD dissertation]. Vienna, Austria: University of Vienna; 2011. [Link]
- [7] Poljansek K, Marín Ferrer M, De Groeve T, Clark I. Science for disaster risk management 2017: Knowing better and losing less. Luxembourg: Publications Office of the European Union; 2017. [Link]
- [8] World Health Organization. Strategic toolkit for assessing risks: A comprehensive toolkit for all-hazards health emergency risk assessment. Geneva: World Health Organization; 2021. [Link]
- [9] Federal Emergency Management Agency (FEMA). National Threat and Hazard Identification and Risk Assessment (THIRA): Overview and Methodology. Washington, DC: FEMA; 2019. [Link]
- [10] Homeland Security. Threat and hazard identification and risk assessment (THIRA) and stakeholder preparedness review (SPR) Guide. Comprehensive preparedness (CPG)201. Washington: Homeland Security; 2018. [Link]
- [11] Wickham ED, Bathke D, Abdel-Monem T, Bernadt T, Bulling D, Pytlík-Zillig L, et al. Conducting a drought-specific THIRA (threat and hazard identification and risk assessment): A powerful tool for integrating all-hazard mitigation and drought planning efforts to increase drought mitigation quality. *International Journal of Disaster Risk Reduction*. 2019; 39:101227. [DOI:10.1016/j.ijdr.2019.101227]
- [12] Kappes MS, Keiler M, von Elverfeldt K, Glade T. Challenges of analyzing multi-hazard risk: A review. *Natural hazards*. 2012; 64:1925-58. [DOI:10.1007/s11069-012-0294-2]
- [13] Nekoei-Moghadam M, Moradi SM, Tavan A. How can the Sendai framework be implemented for disaster risk reduction and sustainable development? A qualitative study in Iran. *Globalization and Health*. 2024; 20(1):23. [DOI:10.1186/s12992-024-01028-w] [PMID]
- [14] Bakkensen LA, Fox-Lent C, Read LK, Linkov I. Validating resilience and vulnerability indices in the context of natural disasters. *Risk Analysis*. 2017; 37(5):982-1004. [DOI:10.1111/risa.12677] [PMID]
- [15] Pringle P, Karali E, Klostermann JEM, Mäkinen K, Prutsch A, Hildén M, et al. National monitoring, reporting and evaluation of climate change adaptation in Europe. Copenhagen: European Environment Agency; 2015. [Link]
- [16] United Nations. Hyogo framework for action 2005-2015: Building the resilience of nations and communities to disasters. New York: United Nations; 2005. [Link]
- [17] Weller D, Schneider S. The WorldRiskIndex 2024. Bochum: Ruhr-University Bochum; 2024. [Link]