A synergistic approach to disaster risk reduction: Integrating collaborative evaluation

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This study explores the potential of integrating the PAR-Sendai Action Framework (PSAF) with the Model for Collaborative Evaluations (MCE) to enhance organizational resilience for disaster risk reduction (DRR). PSAF provides a structured risk assessment and mitigation framework, while the MCE emphasizes stakeholder involvement in guiding collaborative evaluations. The proposed conceptual framework merges these strengths, enabling organizations to collaboratively evaluate DRR measures, identify emerging risks, and refine strategies based on ongoing feedback. The integration of PSAF and the MCE highlights the possibilities of addressing both root causes and immediate risk factors of disasters. The structured risk assessment of PSAF harmonized with the MCE’s focus on stakeholder involvement and continuous evaluation, facilitating an adaptable and proactive DRR strategy. Enhanced stakeholder involvement from community members, authorities, NGOs, and private sector entities fosters a collective understanding of risks and shared responsibility. Continuous monitoring and evaluation ensure the relevance and effectiveness of DRR strategies over time. This dual focus prepares organizations to better endure and recover from disasters, promotes knowledge sharing, and improves the overall effectiveness of DRR initiatives, laying the groundwork for future research on the framework’s practical application.

Key words: Adaptive capacity, PAR-Sendai action framework, collaborative evaluation, disaster risk reduction, model for collaborative evaluations, stakeholder involvement.

INTRODUCTION

Traditional disaster management primarily focuses on reactive measures like response and recovery efforts, often neglecting the underlying factors contributing to a community’s vulnerability (Wisner et al., 2004). While Disaster Risk Reduction (DRR) frameworks like the Sendai Framework (2015) advocate for a proactive and multi-pronged approach, addressing the root causes of disasters remains a challenge (Glasser, 2020). Existing frameworks and their limitations: Models like the Pressure and Release (PAR) by Wisner et al. (2004)
highlight the role of socially determined vulnerabilities stemming from poverty and environmental degradation. Frameworks like the SDFDRR framework emphasize addressing these root causes through sustainable development (Aitsi-Selmi et al., 2015; Pearson and Pelling, 2015; Naheed, 2021). However, existing approaches often lack a holistic strategy that integrates various aspects of DRR.

Building upon these existing frameworks, the PAR-Sendai Action Framework (PSAF) Model offers a comprehensive approach to DRR. It integrates elements such as tackling root causes through sustainable development and good governance, reducing vulnerability by building resilient infrastructure and empowering communities, mitigating hazards through climate-smart solutions and hazard-resistant planning, managing triggers with enhanced early warning systems and robust emergency response, and fostering regional collaboration for knowledge sharing and joint risk assessments.

While the PSAF model offers a valuable framework, continuous monitoring, evaluation, and stakeholder involvement are crucial for ensuring its effectiveness. This is where the Model for Collaborative Evaluations (MCE) comes into play. This study suggests the integration of the PSAF and the MCE. The combined approach can strengthen the effectiveness of DRR initiatives by addressing both root causes and immediate risk factors, promote continuous improvement through ongoing evaluation and stakeholder involvement, and enhance the overall resilience of communities and societies in the face of disasters.

Traditional disaster management primarily focuses on reactive measures like response and recovery efforts (Alexander, 2020; Gaillard, 2010; McEntire, 2021). While crucial in the immediate aftermath of disasters, this approach often neglects addressing the underlying factors contributing to a community’s vulnerability to disasters (Wisner et al., 2004; Wisner et al., 2015). This reactive approach can lead to repeated damage and reconstruction, hindering long-term resilience building (Finucane et al., 2020; Jia et al., 2020; Murtagh et al., 2020).

Recent years have witnessed a growing emphasis on proactive measures for reducing disaster risk before catastrophes strike (Finucane et al., 2020). This shift acknowledges the limitations of solely relying on post-disaster interventions and highlights the importance of investing in preparedness, mitigation, and risk reduction strategies (UNISDR, 2015; Gerrard et al., 2012). A growing body of research emphasizes the need for a paradigm shift toward proactive DRR (Finucane et al., 2020). This proactive approach requires multi-stakeholder involvement, including governments, communities, NGOs, and the private sector (Shaw et al., 2016; Trias and Cook, 2021).

Several frameworks have emerged to address the limitations of reactive disaster management and promote a more comprehensive and multi-pronged approach to DRR. One such framework is the Sendai Framework (2015), which emphasizes risk reduction and resilience building. The Sendai Framework for Disaster Risk Reduction 2015-2030 represents a global agreement that highlights the critical role of risk reduction in building resilience to disasters (Aitsi-Selmi et al., 2015). The framework outlines four priorities for action: Understanding disaster risk, strengthening disaster risk governance, investing in disaster risk reduction for resilience, and enhancing preparedness for effective response, recovery, and reconstruction.

Concerning understanding disaster risk, the framework emphasizes conducting comprehensive risk assessments, identifying vulnerable communities, and analyzing the root causes of disaster risk. Additionally, it stresses establishing effective institutional frameworks, fostering multi-stakeholder collaboration, and investing in risk reduction measures under strengthening disaster risk governance. The framework calls for prioritizing preventive actions such as infrastructure development, early warning systems, and ecosystem-based approaches through investing in disaster risk reduction for resilience. While acknowledging the importance of response and recovery efforts, the Sendai Framework emphasizes the need to build back better by incorporating risk reduction measures into post-disaster reconstruction activities to enhance preparedness for effective response, recovery, and reconstruction (Aitsi-Selmi et al., 2015; Djalante and Lassa, 2019; Zimmermann and Keiler, 2015).

The Sendai Framework has been widely adopted by countries worldwide and serves as a guiding document for national and local DRR strategies (Favre et al., 2018; Djalante and Lassa, 2019; Tiepolo and Braccio, 2020). The other notable framework is the Pressure and Release (PAR) Model. The Pressure and Release (PAR) Model (Wisner et al. 2004) offers a valuable framework for understanding disaster vulnerability. It emphasizes the role of socially constructed factors that can significantly increase a community’s susceptibility to the impacts of hazards. The model conceptualizes vulnerability as the intersection of two key elements: pressure and release. Pressures are the dynamic processes that can weaken a community’s ability to cope with hazards. Examples include poverty, lack of access to basic resources, environmental degradation, and weak governance; while the releases are the factors that can mitigate the negative impacts of hazards. They encompass social safety nets, effective early warning systems, resilient infrastructure, and community preparedness measures.

The PAR Model highlights that disasters are not solely caused by natural hazards but rather by the interplay between these hazards and underlying vulnerabilities (St. Cyr, 2005). A community with strong social safety nets, robust infrastructure, and effective disaster preparedness will be better equipped to withstand the impacts of a
hazard compared to a community lacking these capacities.

The PAR Model has gained significant traction within the DRR community for its emphasis on understanding the root causes of vulnerability and promoting a people-centered approach. The model calls for identifying the social, economic, and political factors contributing to vulnerability. The model facilitates targeted interventions aimed at addressing these underlying issues (Wisner et al., 2012; Blaikie et al., 2014), underscoring the importance of community engagement in DRR initiatives. Vulnerable communities possess valuable knowledge and insights that can inform the development and implementation of effective risk reduction strategies (Parsons et al., 2016; Kamarudin et al., 2022; Sun et al., 2020; Laurien et al., 2022).

Traditional disaster management approaches have primarily focused on reactive response and recovery efforts, neglecting the underlying causes of vulnerability. This limitation has emphasized proactive measures such as risk reduction and resilience building. Several frameworks have emerged to address this need. The Sendai Framework (2015) emphasizes the significance of understanding disaster risk, strengthening governance, investing in preventive actions, and enhancing preparedness. The PAR model by Wisner et al. (2004) highlights the crucial role of addressing socially determined vulnerabilities in mitigating disaster impacts. While these frameworks offer valuable insights, there is a recognized need for a more comprehensive approach that integrates various DRR elements (Goniewicz and Burkle Jr., 2019; Hofmann, 2021; Mattah et al., 2023). This is where the PAR-Sendai Action Framework (PSAF) comes into play.

Building upon the strengths of existing frameworks, the PSAF offers a holistic approach that incorporates elements essential for effective DRR. It goes beyond solely addressing immediate hazards and emphasizes tackling the root causes that contribute to vulnerability. The following section delves into the core components of the PSAF model and its potential contribution to strengthening DRR strategies.

The PSAF incorporates elements from the aforementioned models and emphasizes the following: tackling root causes through sustainable development and good governance, reducing vulnerability by building resilient infrastructure and empowering communities, mitigating hazards through climate-smart solutions and hazard-resistant planning, managing triggers with enhanced early warning systems and robust emergency response, and fostering regional collaboration for knowledge sharing and joint risk assessments (Figure 1). While the PSAF model offers a valuable framework for DRR, continuous monitoring, evaluation, and stakeholder involvement are crucial for ensuring its effectiveness.

The MCE provides a structured approach for involving stakeholders throughout the evaluation process (Rodriguez-Campos and Rincones-Gómez, 2012, 2018b). This model offers several advantages, including enhanced understanding and ownership of evaluation results by stakeholders, improved credibility of the evaluation process, and increased likelihood of implementing evaluation recommendations (Figure 2).

MATERIALS AND METHODS

This section outlines a conceptual framework for integrating the PSAF with the MCE. Due to the theoretical nature of this initial exploration, empirical data collection or specific methodological procedures were not employed.

Data sources

Relevant academic publications, reports from international organizations (such as, UNISDR), and case studies of successful DRR initiatives were reviewed to inform the framework development.

Data analysis

A qualitative approach was employed to critically analyze the potential synergies between the PSAF and the MCE. This analysis involves: Mapping the alignment between PSAF and the corresponding MCE components, identifying potential challenges associated with integrating these models in practical DRR applications, and exploring opportunities for leveraging stakeholder involvement through the MCE to strengthen the effectiveness of DRR initiatives (Table 1).

RESULTS AND DISCUSSION

This article explored the integration of the PAR Sendai Action Framework (PSAF) and the Model for Collaborative Evaluations (MCE) to enhance disaster risk reduction (DRR) efforts. The integration of these frameworks demonstrated the potential to address both root causes and immediate risk factors of disasters, merging PSAF’s structured risk assessment and mitigation approach with MCE’s stakeholder involvement and ongoing evaluation. This combination facilitated the development of an adaptable and proactive DRR strategy, highlighting the benefits of combining structured risk management with collaborative evaluation processes.

Stakeholder involvement might be significantly enhanced by applying the MCE within the PSAF framework, engaging community members, authorities, NGOs, and private sector entities throughout the DRR process. This inclusive approach fostered a collective understanding of risks and shared responsibility for DRR initiatives, which is crucial for effective implementation. Continuous monitoring and evaluation, a key aspect of the MCE, allowed for ongoing assessment of DRR strategies, identifying gaps and areas for improvement, and ensuring the relevance and effectiveness of DRR measures over time.

The integrated frameworks also demonstrated
Figure 1. The PAR-Sendai Action Framework (PSAF).
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Figure 2. The model for collaborative evaluations.
Table 1. PSAF and MCE Integration.

<table>
<thead>
<tr>
<th>PSAF Components</th>
<th>MCE Components</th>
<th>Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>The PSAF is a holistic approach that incorporates elements essential for effective DRR (Akwetey 2023).</td>
<td>This model has a systematic structure and revolves around six interactive components (Rodríguez-Campos and Rincones-Gómez, 2012).</td>
<td>The PSAF and the MCE are adapted to the context of DRR.</td>
</tr>
<tr>
<td>Root cause analysis</td>
<td>Identify the situation</td>
<td>Identify the specific disaster risk scenario and its potential consequences. For example, existing literature on factors contributing to disaster vulnerability are reviewed to identify relevant root causes applicable to the specific context under study.</td>
</tr>
<tr>
<td>Risk reduction strategies</td>
<td>Clarify the expectations</td>
<td>Establish clear objectives and desired outcomes for the evaluation process. For example, established DRR practices are examined to clarify strategies for mitigating hazards, reducing vulnerability, and building resilience.</td>
</tr>
<tr>
<td></td>
<td>Establish a collective commitment</td>
<td>Secure the active involvement and commitment of all relevant stakeholders. For example, mechanisms for engaging various stakeholders (communities, authorities, NGOs, etc.) throughout the DRR process are explored.</td>
</tr>
<tr>
<td></td>
<td>Ensure open communication</td>
<td>Foster transparent communication channels between stakeholders and evaluators. For example, information and exchange ideas are conveyed in order to influence specific evaluation actions.</td>
</tr>
<tr>
<td>Stakeholder involvement</td>
<td>Encourage effective practices</td>
<td>Implement sound strategies to ensure a rigorous and reliable evaluation process. For example, resource requirements are balanced to achieve the desired effect through collaboration.</td>
</tr>
<tr>
<td></td>
<td>Follow specific guidelines</td>
<td>Adhere to established ethical principles and best practices in the collaborative evaluation. For example, guidelines are established to help demonstrate a clearer understanding of the process and how it should be carried out.</td>
</tr>
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</table>

significant potential to enhance organizational resilience by addressing root causes of vulnerability and immediate hazards. This dual focus prepared organizations to better endure and recover from disasters, with PSAF’s emphasis on sustainable development, good governance, and resilient infrastructure complementing MCE’s structured evaluation process. Additionally, the collaborative evaluation process facilitated knowledge sharing among stakeholders, promoting the dissemination of best practices and improving the overall effectiveness of DRR initiatives.

The PSAF model might offer a comprehensive approach to DRR, addressing root causes, reducing vulnerability, mitigating hazards, managing triggers, and fostering regional collaboration. However, a key challenge lies in continuously monitoring and evaluating the effectiveness of these implemented strategies. This is where the MCE comes into play. By incorporating the six MCE interactive components (Rodríguez-Campos and Rincones-Gómez, 2012) within the PSAF framework, the proposed model could facilitate stakeholder involvement throughout the DRR process, collaborative evaluation through the MCE encourages the active engagement of communities, authorities, NGOs, and other relevant stakeholders. This will foster a shared understanding of risks and collective ownership of DRR initiatives, potentially leading to increased commitment and improved implementation.
In terms of continuous evaluation and improvement, the iterative nature of the MCE allows for ongoing assessment of the implemented DRR strategies. Also, stakeholders can identify gaps, challenges, and areas for improvement based on the evaluation findings. These may facilitate adaptive management and refinement of DRR approaches over time.

Finally, enhanced knowledge sharing and learning will afford collaborative evaluation through the MCE, encouraging open communication and knowledge exchange among stakeholders. This can lead to the identification of best practices and the dissemination of successful strategies across different communities.

**Conclusion**

Traditional disaster management approaches often lack emphasis on addressing the underlying causes of disasters. This study addressed this gap by putting forward a novel framework that integrates the PSAF with the MCE.

The presented framework leverages the strengths of both models: PSAF’s comprehensive approach tackles root causes, reduces vulnerability, mitigates hazards, manages triggers, and fosters regional collaboration. The MCE’s six-component structure facilitates stakeholder involvement, effective evaluation, and knowledge sharing throughout the DRR process. By integrating these elements, the PSAF and MCE Integration framework has the potential to do the following: Enhance the effectiveness of DRR strategies by addressing both immediate risks and root causes, promote continuous improvement through ongoing evaluation and stakeholder involvement, increase the overall resilience of communities in the face of disasters, further research is crucial to explore the practical application of this framework, and pilot studies, case analyses, and the development of tailored evaluation tools can validate its effectiveness in real-world settings. This research contributes to the field of DRR by advocating for a more comprehensive approach that integrates root cause analysis, risk reduction strategies, and stakeholder involvement, and proposing a framework that facilitates continuous evaluation and adaptation of DRR initiatives. By strengthening the focus on prevention and building long-term resilience, this framework can contribute to a safer future for communities worldwide.

**RECOMMENDATIONS AND LIMITATIONS**

While this PSAF and MCE Integration framework offers a promising approach, further research is necessary to explore its practical application in real-world settings. This study’s future research directions could involve pilot studies to enable the implementation of the framework in specific disaster-prone communities to assess its feasibility and effectiveness. A case studies approach could also be explored by examining existing DRR initiatives and analyzing how the offered framework could contribute to their improvement. In addition, developing evaluation tools by tailoring the MCE to the specific context of DRR evaluation can potentially create standardized tools and metrics. By addressing these aspects, future research could validate the potential of this integrated approach and contribute to developing more effective and sustainable DRR strategies.

**CONFLICT OF INTERESTS**

The authors have not declared any conflict of interests.


